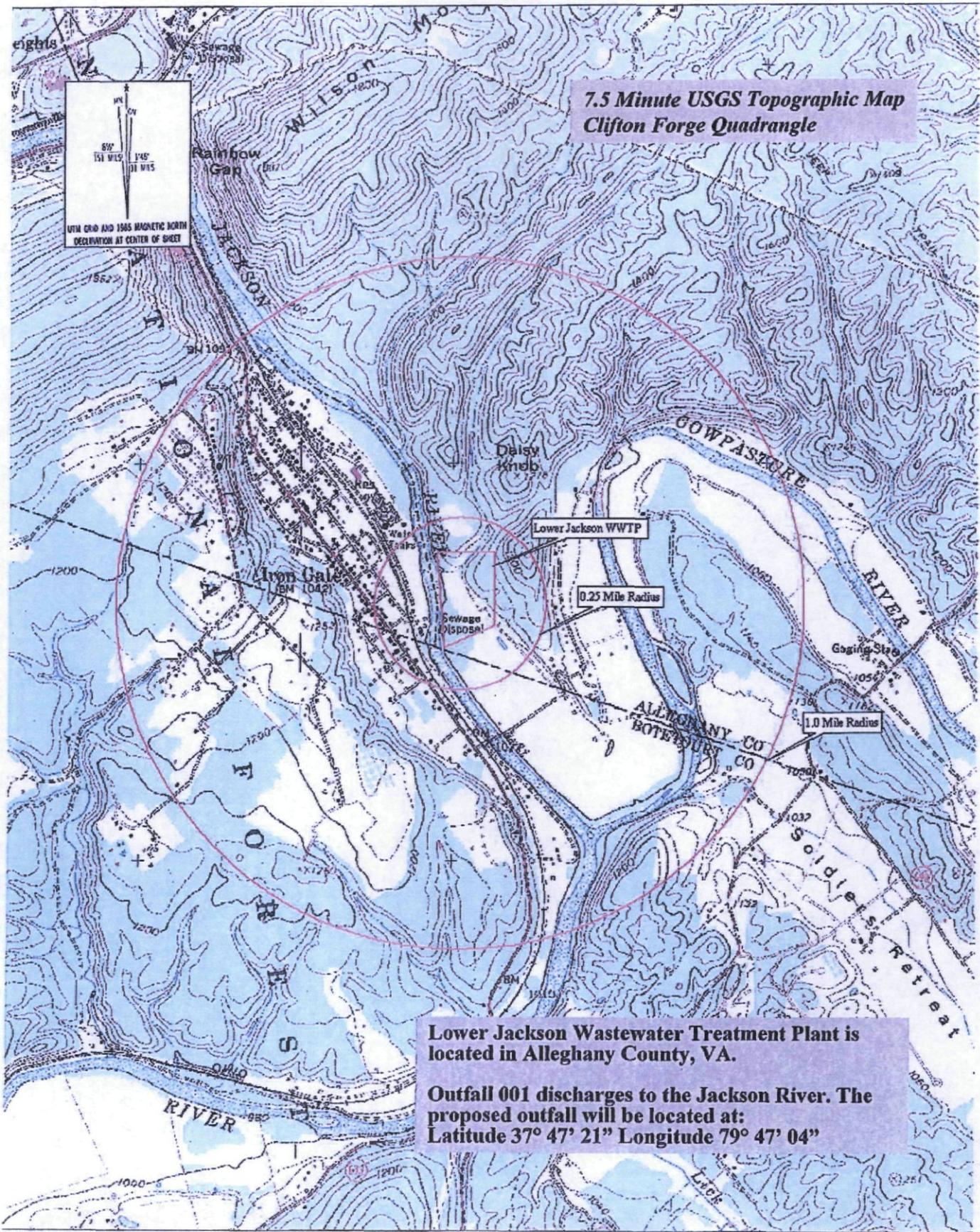


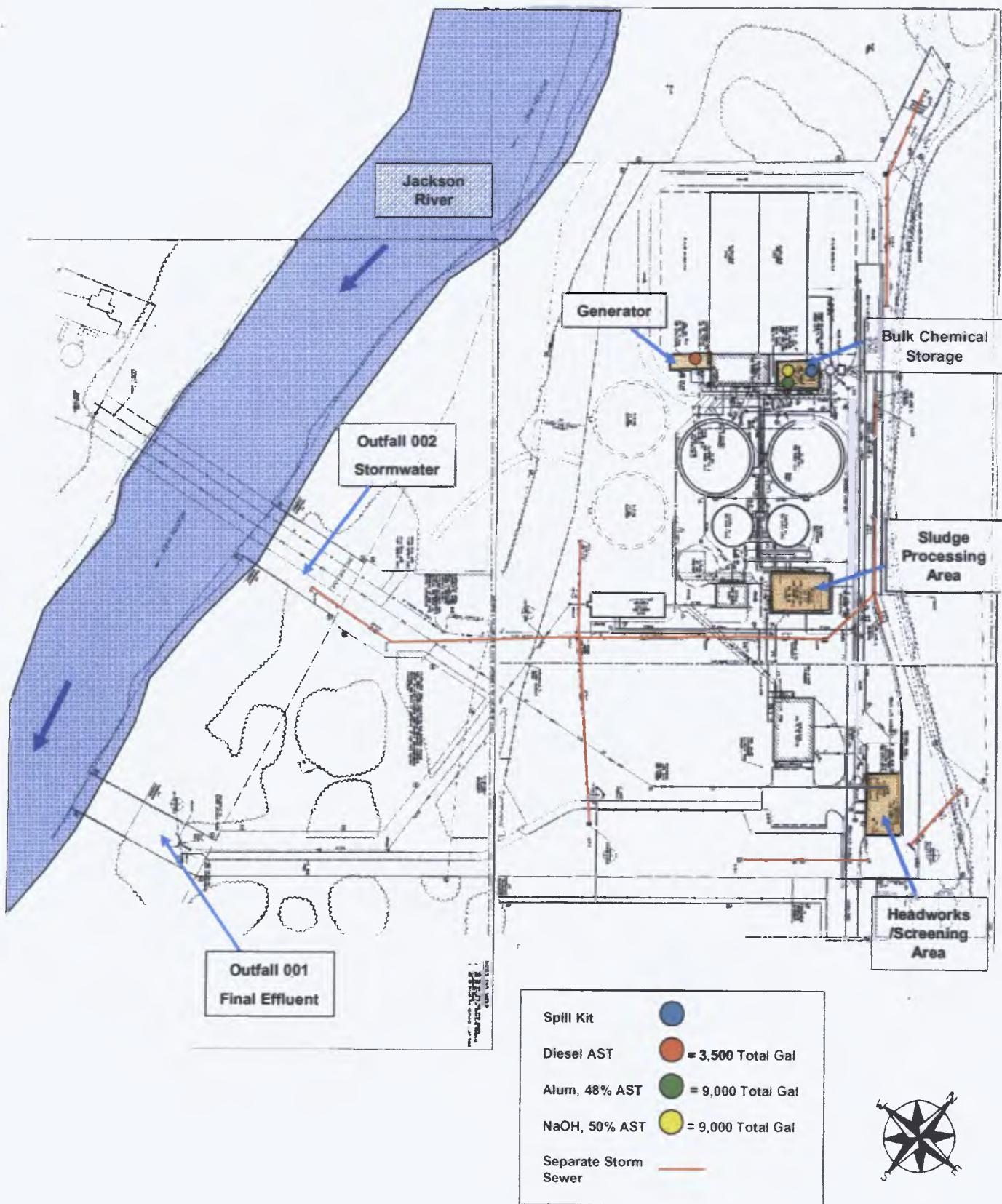
APPENDIX A

Facility Information

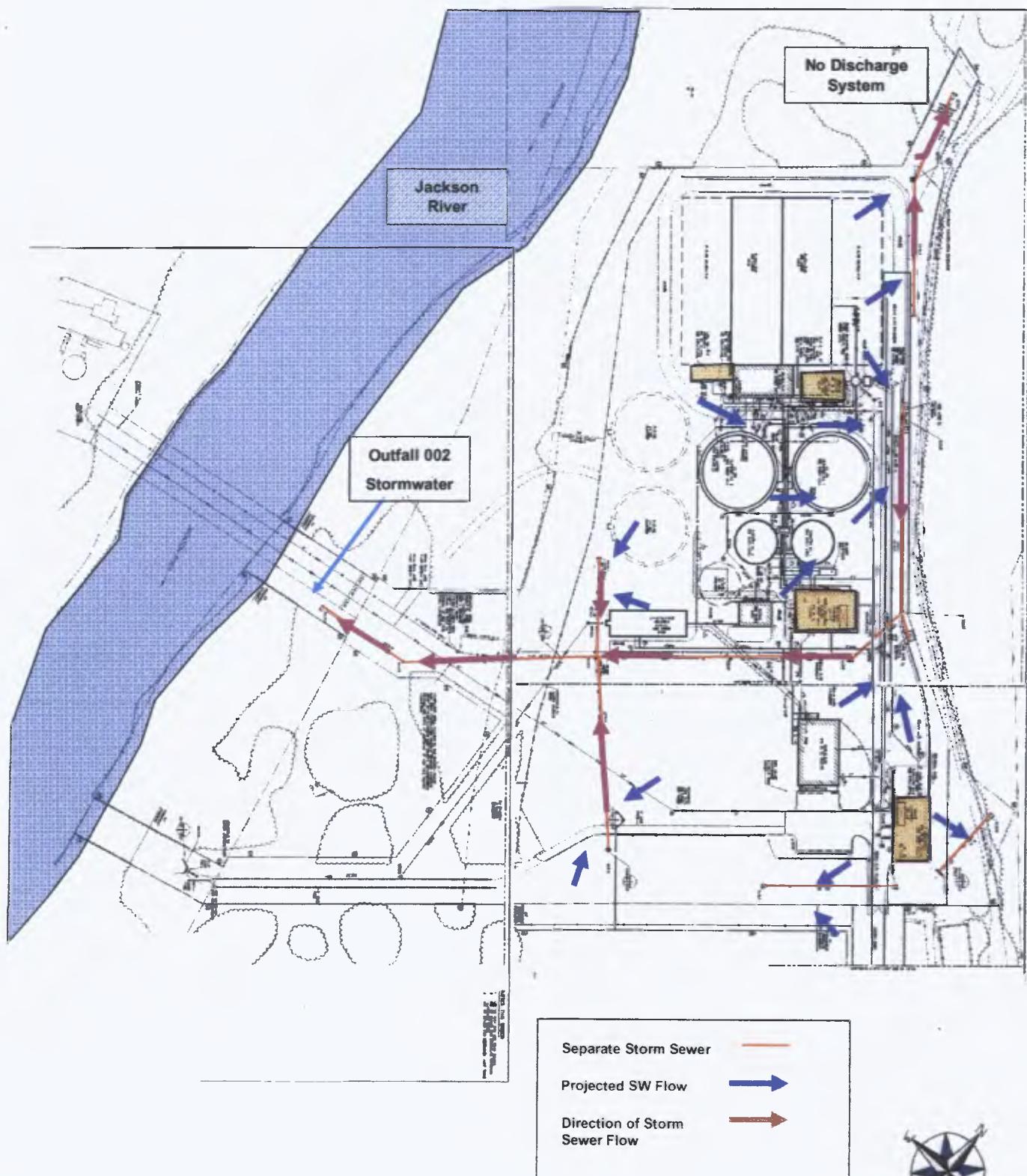


Attachment One

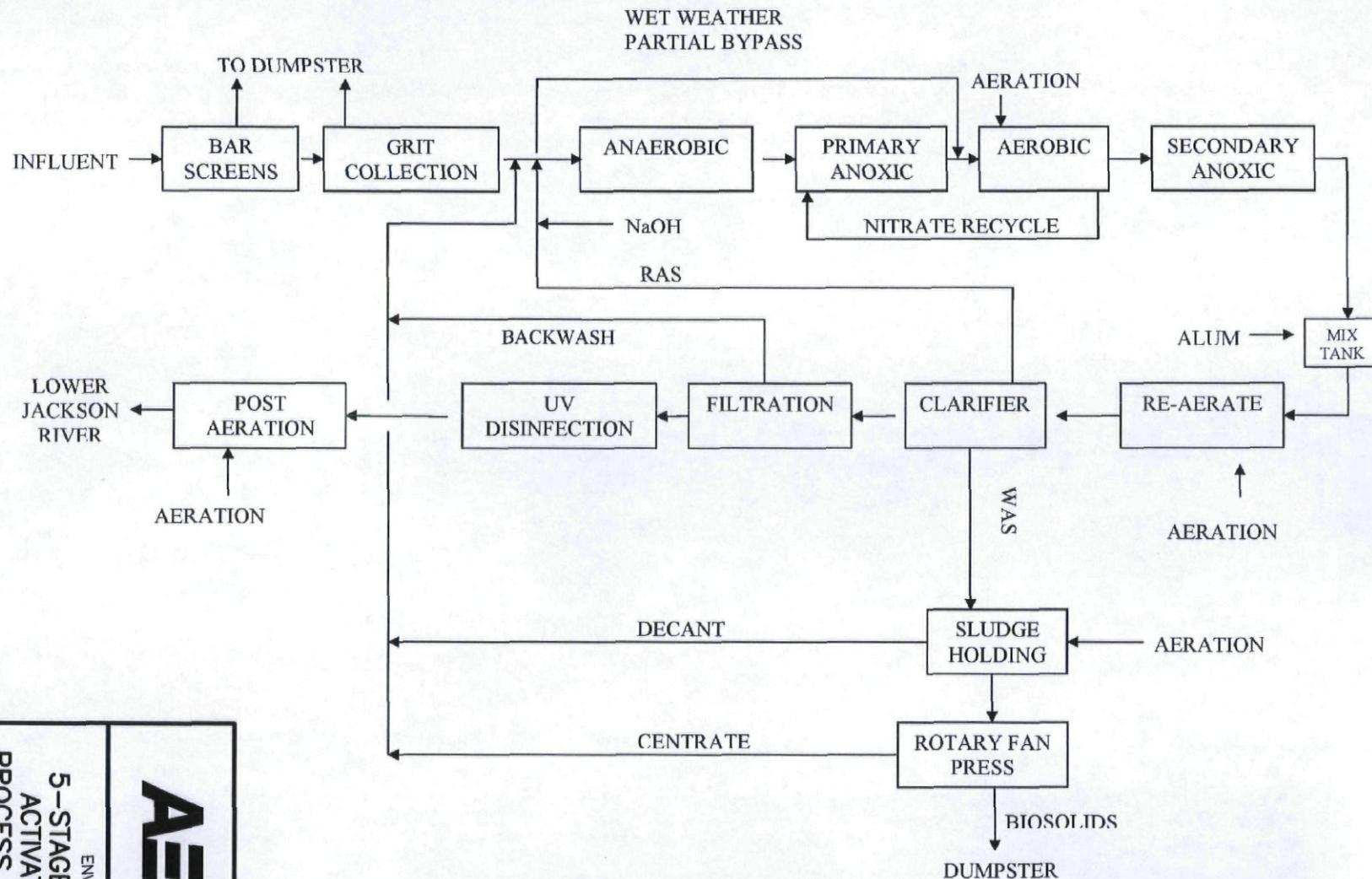
Lower Jackson Regional WWTP Facility Map



Lower Jackson Regional WWTP Projected SW Flow Map



ATTACHMENT #2



LOWER JACKSON RIVER REGIONAL WWTP - 2.6 MGD

AECOM

ENVIRONMENTAL

5-STAGE BARDENPHO
ACTIVATED SLUDGE
PROCESS FLOW DIAGRAM

MARCH 2011

60186P

FIG.5

ALLEGHANY COUNTY, VIRGINIA

Lower Jackson River Regional WWTP

Form 2A Item B.3 – Process Narrative

The Lower Jackson River Regional WWTP is 2.6 MGD wastewater treatment facility which includes Pretreatment, biological and chemical removal, filtration, ultra-violet disinfection, post aeration and sludge management processes.

Wastewater enters the treatment facility at the Headworks Building via a 20" force main from the Iron Gate Pump station. A traveling screen is utilized for screening debris from the wastewater. A manual bar screen is also provided. Grit removal is accomplished using a vortex grit removal system. From the Headworks Building wastewater is conveyed to the Aeration Basins via a 24" gravity pipeline.

The treatment facility is equipped with two Aeration Basins utilizing the Bardenpho Activated sludge process. Wastewater enters the first pre-anoxic zone where it is mixed with Return Activated Sludge from the clarifiers before entering the second pre-anoxic zone. In the second pre-anoxic zone flow is mixed with recycled flow from the end of the aeration tank before flowing into the third and fourth pre-anoxic zones. Nitrogen removal is accomplished in the pre-anoxic zones by converting nitrate and nitrite to oxygen and nitrogen gas, which escapes to the atmosphere.

Flow from the fourth pre-anoxic zone enters the aeration basin. In the aeration tank biological oxygen demand is reduced and ammonia is converted to nitrite and nitrate. The aeration tank is provided with an internal recirculation pump which recirculates up to 300% of the influent zone to the second pre-anoxic zone. From the end of the aeration basin flow enters four post-anoxic zones where additional nitrogen removal is accomplished. In the final post-anoxic zone aluminum sulfate is added prior to flowing to the clarifiers.

The facility is equipped with two centerflow clarifiers. In the clarifiers solids from the mixed liquor from the aeration tank are settled which is pumped back to first pre-anoxic basin tank and mixed with incoming wastewater from the headworks. Clear water overflows the clarifier weirs and flows to the tertiary filters.

The facility is equipped with two cloth media filters which further reduce any particulate matter in the wastewater from the clarifiers. The filters are equipped with filter back wash filters and sludge pumps. Material from the filter back wash is pumped to the filter back wash pump station and subsequently back to the headworks building. Sludge that accumulates in the bottom of the filter tanks is pumped to the aerobic digesters. The filters are equipped with continuous turbidity meters. Effluent from the filters then flows to the UV and NPW shed.

Filter effluent flows to the UV channel which is equipped with two banks of UV lights consisting of forty UV bulbs per bank. The UV system is equipped with an automatic cleaning system to insure the bulbs remain free of debris. From the UV channel, wastewater flows to the post aeration tanks and NPW tank.

The Post Aeration tank is equipped with two blowers and series of diffusers which aerates the wastewater to insure adequate dissolved oxygen content prior to discharge to the Jackson River. The aeration tanks have continuous pH and dissolve oxygen meters.

The NPW tank is equipped with three NPW pumps which supply all the hydrants, wash down equipment and HVAC water demands inside the plant.

Two aerobic digesters are provided. Waste activated sludge is pumped from the return sludge from the clarifiers. Three positive displacement pumps are used to aerate the digester sludge. Sludge from the digesters is pumped to a rotary fan press located in the Solids building.

Sludge from the digesters are pumped to the Rotary fan press which dewateres the sludge. Dewatered sludge is collected in to a hopper which is transported to Amelia Landfill for discposal.

M E M O R A N D U M

DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: Site Visit, Lower Jackson River Regional WWTP, Alleghany County

TO: File

FROM: Lewis Pillis

DATE: April 22, 2011

COPIES:

Today, Christopher Clark, Alleghany County Public Works Director, and Brian White, of ESS, accompanied me on a brief tour of the site. All buildings are under roof and the major treatment units have been constructed. One of the bioreactor basins was full of water for testing. Construction is expected to be complete by the end of summer.

ESC measures have been installed, but a lot of the storm water is ponding on the site. A storm water outlet to the River is present about 200 feet upstream of outfall 001. Some of the inlets were observed. Contributions to the outlet are 1) off site storm water, 2) a grated inlet adjacent to the solids handling building and 3) a grade inlet south of the clarifiers and west of the UV area. Off-site storm water empties into earthen ditches on the east, west and south sides of the WWTP and reenters the storm drain in a manhole south of the plant before being discharged. The site has not been brought to final grade, so it was not possible to determine flow directions on the site.

Both the effluent and storm water outfalls appeared to be constructed according to DCR specs, with the outlets at grade and the ditches protected with riprap.

Effluent will enter the River just upstream of a riffle area. The pool behind the riffle area is small and the river is moving fairly rapidly in this area. At the Rt. 727 bridge, small rocks line the River bottom and the rocks appear to have a brown coating on them.

APPENDIX B

Receiving Stream Information

M E M O R A N D U M

DEPARTMENT OF ENVIRONMENTAL QUALITY
West Central Regional Office

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: Flow Frequency Determination, Lower Jackson River STP,
VPDES Permit No. VA0090671

TO: File

FROM: Lewis Pillis *ZP*

DATE: March 6, 2006

COPIES:

Critical flows for the gages used in preparing the referenced permit have changed since development of the last permit. Eugene Powell, DEQ-Office of Surface Water Investigations, updated the gage statistics in 2005. Critical flows for the Jackson and James River gages includes flows released from Gathright dam in these calculations. Using the same method that was employed in the issuance of the subject permit, flows from the Cowpasture River near Clifton Forge (# 02016000), were subtracted from flows of the James River at Lick Run (# 02016500), which is about 4 miles downstream of the discharge point. Drainage area proportions were then used to project critical flows at the discharge point. Since the Clifton Forge STP will simultaneously go offline when discharge from the Lower Jackson River STP begins, this flow is also subtracted from the critical river flow. The attached spreadsheet details these calculations.

Critical flows at the discharge point once the Clifton Forge STP goes offline are:

1Q10 – 119 MGD
7Q10 – 129 MGD
30Q10 – 141 MGD
30Q5 – 156 MGD
HF 1Q10 – 154 MGD
HF 7Q10 – 191 MGD
HF 30Q10 – 226 MGD
Harmonic Mean – 353 MGD

High Flow Months – JAN - MAY
Period Used – 1980– 2003

QUAD	REGION	DAAREA	HARMEAN	HF30Q10			HF7Q10		HF1Q10		Z30Q5		Z30Q10		Z7Q10		Z1Q10		Z1Q30	
				cfs																
02016500	James River at Lick Run, Va.	Clifton Forge	WCRO	1373	745	479	393	325	315	286	261	242	200							
02016000	Cowpasture River near Clifton Forge, Va.	Clifton Forge	WCRO	461	191	124	92	82	69	63	56	53	47							
	James River at Lick Run, Va. MINUS Cowpasture River			912	554	355	301	243	246	223	205	189	153							
James River	at outfall for Lower Jackson River STP	Drainage area proportions	904.5/912 0.991776	549	352	299	241	244	221	203	187	152								
		convert to MGD:																		
James River at Lick Run, Va.	Clifton Forge	WCRO		481	310	254	210	204	185	169	156	129								
Cowpasture River near Clifton Forge, Va.	Clifton Forge	WCRO		123	80	59	53	45	41	36.2	34.3	30.4								
Less Clifton Forge STP contribution				355	228	193	156	158	143	131	121	98								
Final critical flows at Lower Jackson STP				2	2	2	2	2	2	2	2	2								
				353	226	191	154	156	141	129	119	96								

mix 2_6 MGD.txt

Mixing Zone Predictions for

Lower Jackson 2.6 MGD

Effluent Flow = 2.6 MGD
Stream 7Q10 = 129 MGD
Stream 30Q10 = 141 MGD
Stream 1Q10 = 119 MGD
Stream slope = 0.0016 ft/ft
Stream width = 148 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.7662 ft
Length = 12816.15 ft
Velocity = .7793 ft/sec
Residence Time = .1903 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 1.8619 ft
Length = 12254.82 ft
Velocity = .8066 ft/sec
Residence Time = .1758 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 1.6837 ft
Length = 13347.09 ft
Velocity = .7554 ft/sec
Residence Time = 4.908 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 20.37% of the 1Q10 is used.

virginia DEQ Mixing Zone Analysis Version 2.1

Mixing Zone Predictions for

Lower Jackson River WWTP

Effluent Flow = 3.5 MGD

Stream 7Q10 = 129 MGD

Stream 30Q10 = 226 MGD

Stream 1Q10 = 119 MGD

Stream slope = .0016 ft/ft

Stream width = 148 ft

Bottom scale = 3

Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.7735 ft

Length = 12771.32 ft

Velocity = .7814 ft/sec

Residence Time = .1892 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 2.475 ft

Length = 9614.88 ft

Velocity = .9699 ft/sec

Residence Time = .1147 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 1.6912 ft

Length = 13296.84 ft

Velocity = .7576 ft/sec

Residence Time = 4.8753 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 20.51% of the 1Q10 is used.

Dischargers and Sampling Stations on the Jackson - James River

Diurnal 2006 DEQ

ONAME	FNAME	FIPS	OUTFALLNO	DIS_FLOW	DISCHCAT	STRCODE	RIVERMI	model mile	model mile
APXB station	One Mile below McClintic - Sta. No. 4			A	2-JKS053.48-TL			53.48	
APXB station	Bolar Mtn. Campground - Sta. No. 3			A	2-JKS048.90-BL			48.90	
APXB station	Bolar Mtn. Campground - Sta. No. 3			A	2-JKS048.90-TL			48.90	
APXB station	WQS - Lake Moomaw (Lower Lake)			C	2-JKS047.06			47.06	
APXB station	Conflu. w/Big Lick Cr. - Sta. No. 2			A	2-JKS046.40-BL			46.40	
APXB station	Conflu. w/Big Lick Cr. - Sta. No. 2			A	2-JKS046.40-TL			46.40	
APXB station	Dam - Station No. 1			A	2-JKS044.60-BL			44.60	
APXB station	Dam - Station No. 1			A	2-JKS044.60-TL			44.60	
APXB station	Below Gathwright Dam at gage			A	2-JKS044.10			44.10	
U.S. Army Corps of Engineers	Morris Hill STP	005	001	0.01500	Sewage	JKS		43.55	
APXB station	Near Camp Appalachia			B	2-JKS039.01			39.01	
Sponaugle, Frank	Sponaugle Subd.	005	001	0.01600	Sewage	JKS		34.93	
APXB station	Rt. 687 Bridge - Clearwater Park			A,B,SS	2-JKS030.65			30.65	
APXB station	Covington Water Filtration Plant			SS1, SS2	2-JKS026.01			26.01	
Covington, City of	Jackson R. WTP		001	4.0000	Intake	Jackson R.		26.00	
WESTVACO	WESTVACO		002		Intake	Jackson R.		25.88	
WESTVACO	WESTVACO		003		Intake	Jackson R.		25.56	
WESTVACO	WESTVACO		004		Intake	Jackson R.		25.52	
WESTVACO	WESTVACO	005	007		Storm Water	JKS		25.44	
WESTVACO	WESTVACO	005	005		Storm Water	JKS		25.36	
WESTVACO	WESTVACO	005	006		Storm Water	JKS		25.20	
WESTVACO	WESTVACO		005		Intake	Jackson R.		25.09	
WESTVACO	WESTVACO		006		Intake	Jackson R.		25.08	
Martin County Coal Corporation	Coal Handling Facility	005	006	0.00000	Storm Water	JKS		24.96	
WESTVACO	WESTVACO	005	001	33.00000	Storm Water	JKS		24.92	
WESTVACO	WESTVACO	005	008	0.00000	Storm Water	JKS		24.84	
WESTVACO	WESTVACO		007		Intake	Jackson R.		24.80	
WESTVACO	WESTVACO		008		Intake	Jackson R.		24.69	
WESTVACO	WESTVACO	005	002	23.20000	Storm Water	JKS		24.68	
WESTVACO	WESTVACO	005	003	27.60000	Process	JKS		24.64	
WESTVACO	WESTVACO	005	009	0.00000	Storm Water	JKS		24.52	
WESTVACO	WESTVACO	005	010	0.00000	Storm Water	JKS		24.48	
WESTVACO	WESTVACO	005	011	0.00000	Storm Water	JKS		24.47	
WESTVACO	WESTVACO	005	012	0.00000	Storm Water	JKS		24.26	
WESTVACO	WESTVACO	005	013	0.00000	Storm Water	JKS		24.25	
APXB station	Rt. 60 Bridge			SS	2-JKS024.20			24.20	
APXB station	City Park - Covington at gage			A,B	2-JKS023.61			23.61	
APXB station	City Park - Covington at gage			SS	2-JKS023.61			23.61	
APXB station	Swinging Bridge			SS	2-JKS023.32			23.32	
APXB station	Fudge's Bridge, Rt. 154, Covington			SS	2-JKS022.78			22.78	
APXB station	Industrial Park behind Walmart			SS1, SS2	2-JKS022.15			22.15	
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	004		Storm Water	JKS		21.07	
APXB station	S. Rayon Dr. Bridge, Covington			SS	2-JKS021.06			21.06	
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	002	0.60000	Fire Water Storage Tanks	JKS		19.72	
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	001	0.90000	Process	JKS		19.22	
Applied Extrusion Technologies, Inc	AET - Covington Plant	580	003	0.00000	Storm Water	JKS		19.22	
Covington, City of	Covington STP	580	001	3.00000	Sewage	JKS		19.03	
APXB station	Rt. 18 Bridge at Covington			A,B,SS	2-JKS018.68			18.68	
APXB station	Byrd's Farm East of Covington			SS	2-JKS017.30			17.30	
APXB station	Byrd's Farm #2			SS	2-JKS017.03			17.03	
APXB station	Between I-64 & CSX Railroad N/Mallow			SS	2-JKS015.80			15.80	

Dischargers and Sampling Stations on the Jackson - James River

Diurnal 2006 DEQ

ONAME	FNAME	FIPS	OUTFALLNO	DIS_FLOW	DISCHCAT	STRCODE	RIVERMI	model mile	model mile
APXB station	Island Ford Cave above Low Moor			SS	2-JKS013.45		13.45		
APXB station	Off Rt. 696 above Lowmoor			A,B	2-JKS013.29		13.29		
APXB station	Island Ford Bridge, Rt. 1101			SS	2-JKS011.92		11.92		
Alleghany County	Low Moor STP	005	001		0.5 Sewage	JKS	10.05		
APXB station	Low Water Bridge - near Dabney Lancaster			A,B	2-JKS006.67		6.67	0	
CSX Transportation, Inc.	Clifton Forge	560	001	0.05470	Process	JKS	4.72	1.95	
Clifton Forge, City of	Clifton Forge STP	560	001	2.00000	Sewage	JKS	3.46	3.21	
Parker Hannifin Corp.	Parker Hannifin Powertrain Div.	005	002	0.32300	Cooling-Contact	JKS	1.21	5.46	
Parker Hannifin Corp.	Parker Hannifin Powertrain Div.	005	001	0.02300	Process	JKS	1.17	5.50	
Parker Hannifin Corp.	Parker Hannifin Powertrain Div.	005	999	0.02300	Process	JKS	1.17	5.50	
Alleghany Co.	Proposed Lower Jackson river STP				Sewage		0.76	5.91	0
APXB station	Rt. 727 Bridge - near Iron Gate			A	2-JKS000.38		0.38	6.29	0.38
Confluence of Cowpasture and Jackson						JMS	346.49	6.67	0.76
APXB station	Rt. 220 Bridge - near Gage			B	2-JMS345.73		345.73	7.43	1.52
Botetourt County	Glen Wilton STP	023	001	0.02000	Sewage	JMS	342.85	10.31	4.40
APXB station	James R. at Salisbury			A,B	2-JMS326.30		326.30	26.86	20.95
Botetourt County	Buchanan STP	023	001	0.23750	Sewage	JMS	308.51	44.65	38.74
APXB station	Rt. 501 Bridge - S.E. of Glasgow			A	2-JMS282.28		282.28	70.88	64.97
Georgia Pacific Co	GP, Big Island Plant	019	021	0.00600	Storm Water - Unloading Area	JMS	278.89	74.27	68.36

Station ID

2-JKS000.38

SR 727 at Iron Gate

Field data

0.4 mi downstream of LJRR WWTP

Collection Date Time	Temp	Celc	Do	Probe	Field pH
01/05/2005 11:30	12.34		10.39		7.74
03/29/2005 13:30		10.42		10.95	8.06
05/02/2005 11:00		12.24		10.04	8.08
07/12/2005 11:00		23.4		7.9	7.9
09/28/2005 11:00		20.5		9.7	8.25
11/09/2005 09:30		13.7		9.7	8.1
01/24/2006 10:30		6.6		12.4	7.8
03/30/2006 10:30		10.8		12.7	7.5
05/01/2006 11:00		15.3		10	7
07/31/2006 11:00		24.6		8.4	7.3
09/07/2006 10:30		20.3		9.8	8.1
11/14/2006 15:00		11.4		9.9	8.1
01/10/2007 10:00		6.3		11.1	7.8
03/22/2007 10:00		11		11.2	7.7
05/15/2007 11:30	NULL	NULL	NULL		
07/26/2007 10:00		21		8.9	6.8
09/27/2007 11:00		22.6		8.1	6.5
11/19/2007 11:30		9.8		12.5	6.1
01/08/2008 10:30		8.6		8.6	6.2
03/13/2008 10:30		14.2		9.2	6.6
03/25/2008 10:30		9.7		12.3	7
05/07/2008 10:30		15.9		9.4	6.5
07/29/2008 11:00		24.2		9.5	7.2
09/22/2008 10:30		18.9		8.9	6.8
11/24/2008 10:00		4.5		13.7	7.1
01/22/2009 11:00		1.9		15.9	7.3
03/11/2009 11:30		13.4		11.1	7.3
05/05/2009 11:30		10.2		11.4	6.6
07/07/2009 10:30		20.7		8.4	7.1
09/02/2009 12:00		21.1		9.2	7.2
11/30/2009 11:00		11.1	NULL		7.4
02/24/2010 14:10		5.6		12.2	7.7
04/01/2010 10:15		10.3		11.1	7.8
06/16/2010 10:45		25.3		8.2	7.9
08/17/2010 07:46		24.3		7.3	7.8
10/26/2010 15:00		16.8		10.1	8.1
12/29/2010 14:40		3.5	NULL		8.4
02/17/2011 09:30		7.7		11.9	8
04/20/2011 13:10		11.8	NULL		7.9
06/23/2011 10:30		23.4		7.4	7.4
08/17/2011 11:00		23.1		9.4	8.2
90% =>	23.48			8.1	
10/13/2011 11:45		17.9		9.7	8.2 *
12/29/2011 12:20		6.1		11.6	7.7 *
02/22/2012 11:30		6.5		12.2	7.4 *
03/08/2012 11:00		9.4		11.7	7.1 *
05/24/2012 11:45		17.8		9.3	8.1 *

* after discharge from LJRR WWTP began

25.3 7.3 8.4
max min max

90% =>	23.44	8.1
------------------	--------------	------------

using all
data listed

Station 2-JKS006.67

upstream at Dabney Lancaster

Field data

Collection Date	Temp Time	Celcius	Do Probe	Field pH
01/09/2001		4.1	12.5	8.41
02/01/2001		6	12.3	7.99
03/01/2001		7.5	12.1	9.05
04/02/2001		7.7	11.8	8.64
05/01/2001		21.1	10.34	8.89
06/05/2001		20	8.51	8.09
07/19/2001		23.8	7.89	8.2
09/10/2001		23.9	8.38	8.59
11/28/2001		15.2	9.59	8.28
01/22/2002		7	12.67	8.57
03/26/2002		11.9	9.26	7.53
05/23/2002		18.39	12.23	8.56
07/18/2002		24.33	6.59	7.7
09/17/2002		23.45	8.57	8.27
11/18/2002		9.4	10.53	8.19
02/03/2003		8	14.1	8.8
03/25/2003		12.01	11.77	8.43
05/27/2003		14.79	9.78	7.51
10/24/2006		10.6	12.3	8.4
10/26/2006		12.7	10.1	7.8
10/30/2006		12.7	11.9	8.2
02/24/2010		5.4	12.2	7.6
04/01/2010		9.7	11.3	7.7
06/16/2010		27.3	9.9	8
08/16/2010		26.3	9.2	8.3
08/17/2010		26.8	9.5	8.4
08/18/2010		21.1	9.7	8.1
10/26/2010		18.3	9.9	8
12/29/2010		4.3	NULL	8.4
02/16/2011		9.3	14.2	8.3
04/19/2011		9.6	NULL	7.8
06/22/2011		23	7.5	7.1
08/16/2011		22.3	8.5	7.9
10/12/2011		17	8.9	8
12/28/2011		7.2	11.5	7
Max =>		27.3	14.2	9.05
Min =>		4.1	6.59	7
90% =>		24.2		8.6

Station ID 2-JKS000.38

most recent data 00900
HARDNESS,
TOTAL
(MG/L AS
CACO3)

01/13/2000	129
02/24/2000	87
03/28/2000	90
04/19/2000	50
05/15/2000	NULL
05/15/2000	166
06/01/2000	94
07/10/2000	165
08/01/2000	124
09/07/2000	114
10/04/2000	137
11/02/2000	215
12/06/2000	224
01/16/2001	233
02/01/2001	124
03/01/2001	187.9
04/02/2001	29.2
05/01/2001	144
06/05/2001	119
06/28/2001	NULL
07/19/2001	138
08/16/2001	90.3
09/10/2001	200
10/10/2001	209
11/28/2001	182
12/18/2001	159
01/22/2002	217
02/19/2002	205
03/26/2002	143
04/17/2002	104
05/23/2002	144
06/17/2002	163
07/18/2002	171
08/07/2002	182
09/17/2002	191
10/21/2002	195
11/18/2002	68.4
12/16/2002	63.6
02/03/2003	175
03/03/2003	61.3
03/25/2003	45.9
05/01/2003	98.1
06/19/2003	56.9
average =	139

APPENDIX C

Permit Development

Dissolved Oxygen Model
2.6 MGD WWTP

modout LJR - manning's ok at 30BOD 9TKN - 6.5 mgd.txt
"Model Run For C:\Documents and Settings\ljpillis\My Documents\water\Models\stream
model\model runs\lower Jackson\5 segments using Mannings 30BOD 9TKN 6.5 MGD.mod On
2/24/2009 2:18:21 PM"

"Model is for JACKSON - JAMES RIVER."
"Model starts at the LOWER JACKSON RIVER WWTP discharge."

"Background Data"
"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
129.436, 5, 1.1, 5.609, 31

"Discharge/Tributary Input Data for Segment 1"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
2.6, 30, 9, ,6, 31

"Hydraulic Information for Segment 1"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.78, 147.999, 1.927, .716

"Initial Mix Values for Segment 1"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
132.036, 5.617, 13.731, .512, 7.344, 31

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, 1.16, 3.846, 4.993, .25, .583, 0, 0

"Output for Segment 1"
"Segment starts at LOWER JACKSON RIVER WWTP"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 5.617, 13.731, .512
.1, .1, 5.554, 13.596, .509
.2, .2, 5.495, 13.462, .506
.3, .3, 5.44, 13.329, .503
.4, .4, 5.388, 13.198, .501
.5, .5, 5.34, 13.068, .499
.6, .6, 5.295, 12.939, .497
.7, .7, 5.253, 12.812, .495
.78, .78, 5.222, 12.711, .493

"Discharge/Tributary Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
36.2, 2, 0, ,6.611, 31

"Incremental Flow Input Data for Segment 2"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.922, 5, 1.1, ,6.611, 31

"Hydraulic Information for Segment 2"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.76, 155.001, 1.775, .689

modout LJR - manning's ok at 30BOD 9TKN - 6.5 mgd.txt

"Initial Mix Values for Segment 2"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
169.158, 5.527, 11.06, .385, 7.346, 31

"Rate Constants for Segment 2. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, 1.16, 3.947, 5.124, .25, .583, 0, 0

"Output for Segment 2"
"Segment starts at COWPASTURE RIVER"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
.78, 0, 5.527, 11.06, .385
.88, .1, 5.495, 10.947, .383
.98, .2, 5.466, 10.835, .381
1.08, .3, 5.439, 10.724, .379
1.18, .4, 5.414, 10.614, .377
1.28, .5, 5.392, 10.505, .375
1.38, .6, 5.372, 10.397, .373
1.48, .7, 5.354, 10.291, .371
1.54, .76, 5.344, 10.228, .37

"Discharge/Tributary Input Data for Segment 3"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.5, 2, 0, , 6.612, 31

"Incremental Flow Input Data for Segment 3"
"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
0, 5, 1.1, , 6.614, 31

"Hydraulic Information for Segment 3"
"Length", "Width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
2.88, 155.001, 1.778, .613

"Initial Mix Values for Segment 3"
"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
169.658, 5.348, 10.213, .369, 7.348, 31

"Rate Constants for Segment 3. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, 1.16, 3.125, 4.056, .25, .583, 0, 0

"Output for Segment 3"
"Segment starts at LICK RUN"
"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
1.54, 0, 5.348, 10.213, .369
1.64, .1, 5.31, 10.096, .367
1.74, .2, 5.275, 9.98, .365
1.84, .3, 5.243, 9.865, .363
1.94, .4, 5.213, 9.752, .361
2.04, .5, 5.186, 9.64, .359

modout LJR - manning's ok at 30BOD 9TKN - 6.5 mgd.txt

2.14,	.6,	5.161,	9.529,	.357
2.24,	.7,	5.138,	9.419,	.355
2.34,	.8,	5.117,	9.311,	.353
2.44,	.9,	5.099,	9.204,	.351
2.54,	1,	5.082,	9.098,	.349
2.64,	1.1,	5.067,	8.993,	.347
2.74,	1.2,	5.054,	8.89,	.345
2.84,	1.3,	5.043,	8.788,	.343
2.94,	1.4,	5.033,	8.687,	.341
3.04,	1.5,	5.025,	8.587,	.339
3.14,	1.6,	5.018,	8.488,	.337
3.24,	1.7,	5.013,	8.39,	.335
3.34,	1.8,	5.009,	8.294,	.333
3.44,	1.9,	5.006,	8.199,	.331
3.54,	2,	5.005,	8.105,	.329
3.64,	2.1,	5.005,	8.012,	.327
3.74,	2.2,	5.006,	7.92,	.325
3.84,	2.3,	5.008,	7.829,	.323
3.94,	2.4,	5.011,	7.739,	.321
4.04,	2.5,	5.015,	7.65,	.319
4.14,	2.6,	5.019,	7.562,	.317
4.24,	2.7,	5.024,	7.475,	.315
4.34,	2.8,	5.03,	7.389,	.313
4.42,	2.88,	5.035,	7.321,	.312

"Discharge/Tributary Input Data for Segment 4"

"Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .02, 30, 15, ,5, 31

"Incremental Flow Input Data for Segment 4"

"Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 0, 5, 1.1, ,6.616, 31

"Hydraulic Information for Segment 4"

"Length", "Width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 1.1, 160.002, 1.815, .581

"Initial Mix Values for Segment 4"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 169.678, 5.035, 7.329, .318, 7.351, 31

"Rate Constants for Segment 4. - (All units Per Day)"

"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .5, .829, 2.727, 3.54, .25, .583, 0, 0

"Output for Segment 4"

"Segment starts at GLEN WILTON STP"

"Total", "Segm."

"Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 4.42, 0, 5.035, 7.329, .318
 4.52, .1, 5.055, 7.265, .316
 4.62, .2, 5.075, 7.202, .314
 4.72, .3, 5.095, 7.139, .312
 4.82, .4, 5.115, 7.077, .31
 4.92, .5, 5.135, 7.016, .308

modout LJR - manning's ok at 30BOD 9TKN - 6.5 mgd.txt
 5.02, .6, 5.154, 6.955, .306
 5.12, .7, 5.173, 6.895, .304
 5.22, .8, 5.192, 6.835, .302
 5.32, .9, 5.211, 6.776, .3
 5.42, 1, 5.23, 6.717, .298
 5.52, 1.1, 5.249, 6.659, .296

"Discharge/Tributary Input Data for Segment 5"
 "Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .24, 2, 0, ,6.617, 31

"Incremental Flow Input Data for Segment 5"
 "Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 0, 5, 1.1, ,6.622, 31

"Hydraulic Information for Segment 5"
 "Length", "Width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 6.24, 149.998, 1.679, .671

"Initial Mix Values for Segment 5"
 "Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 169.918, 5.251, 6.657, .296, 7.357, 31

"Rate Constants for Segment 5. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .5, .829, 4.038, 5.242, .25, .583, 0, 0

"Output for Segment 5"
 "Segment starts at BIG CREEK"
 "Total", "Segm."

"Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 5.52, 0, 5.251, 6.657, .296
 5.62, .1, 5.299, 6.607, .294
 5.72, .2, 5.345, 6.557, .292
 5.82, .3, 5.389, 6.508, .29
 5.92, .4, 5.431, 6.459, .288
 6.02, .5, 5.472, 6.41, .286
 6.12, .6, 5.511, 6.362, .284
 6.22, .7, 5.549, 6.314, .282
 6.32, .8, 5.585, 6.267, .281
 6.42, .9, 5.62, 6.22, .28
 6.52, 1, 5.654, 6.173, .279
 6.62, 1.1, 5.687, 6.127, .278
 6.72, 1.2, 5.718, 6.081, .277
 6.82, 1.3, 5.748, 6.035, .276
 6.92, 1.4, 5.777, 5.99, .275
 7.02, 1.5, 5.805, 5.945, .274
 7.12, 1.6, 5.832, 5.9, .273
 7.22, 1.7, 5.858, 5.856, .272
 7.32, 1.8, 5.884, 5.812, .271
 7.42, 1.9, 5.909, 5.768, .27
 7.52, 2, 5.933, 5.725, .269
 7.62, 2.1, 5.956, 5.682, .268
 7.72, 2.2, 5.978, 5.639, .267
 7.82, 2.3, 6, 5.597, .266

modout LJR - manning's ok at 30BOD 9TKN - 6.5 mgd.txt

7.92,	2.4,	6.021,	5.555,	.265
8.02,	2.5,	6.041,	5.513,	.264
8.12,	2.6,	6.061,	5.472,	.263
8.22,	2.7,	6.08,	5.431,	.262
8.32,	2.8,	6.098,	5.39,	.261
8.42,	2.9,	6.116,	5.349,	.26
8.52,	3,	6.133,	5.309,	.259
8.62,	3.1,	6.15,	5.269,	.258
8.72,	3.2,	6.166,	5.229,	.257
8.82,	3.3,	6.182,	5.19,	.256
8.92,	3.4,	6.197,	5.151,	.255
9.02,	3.5,	6.212,	5.112,	.254
9.12,	3.6,	6.227,	5.074,	.253
9.22,	3.7,	6.241,	5.036,	.252
9.32,	3.8,	6.255,	5,	.251
9.42,	3.9,	6.305,	5,	.25
9.52,	4,	6.353,	5,	.249
9.62,	4.1,	6.399,	5,	.248
9.72,	4.2,	6.442,	5,	.247
9.82,	4.3,	6.483,	5,	.246
9.92,	4.4,	6.522,	5,	.245
10.02,	4.5,	6.56,	5,	.244
10.12,	4.6,	6.596,	5,	.243
10.22,	4.7,	6.622,	5,	.242
10.32,	4.8,	6.622,	5,	.241
10.42,	4.9,	6.622,	5,	.24
10.52,	5,	6.622,	5,	.239
10.62,	5.1,	6.622,	5,	.238
10.72,	5.2,	6.622,	5,	.237
10.82,	5.3,	6.622,	5,	.236
10.92,	5.4,	6.622,	5,	.235
11.02,	5.5,	6.622,	5,	.234
11.12,	5.6,	6.622,	5,	.233
11.22,	5.7,	6.622,	5,	.232
11.32,	5.8,	6.622,	5,	.231
11.42,	5.9,	6.622,	5,	.23
11.52,	6,	6.622,	5,	.229
11.62,	6.1,	6.622,	5,	.228
11.72,	6.2,	6.622,	5,	.227
11.76,	6.24,	6.622,	5,	.227

"END OF FILE"

Dissolved Oxygen Model
3.5 MGD WWTP

modout LJR - manning's ok at 26
"Model Run For C:\water\Models\stream model\model runs\lower Jackson\5 segments
using Mannings 26BOD.mod On 4/4/2006 10:16:04 AM"

"Model is for JACKSON - JAMES RIVER."
"Model starts at the LOWER JACKSON RIVER WWTP discharge."

"Background Data"

"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
129.436, 5, 1.1, 5.609, 31

"Discharge/Tributary Input Data for Segment 1"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
3.5, 26, 5, .6, 31

"Hydraulic Information for Segment 1"

"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.78, 147.999, 1.935, .718

"Initial Mix Values for Segment 1"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
132.936, 5.62, 13.882, .228, 7.344, 31

"Rate Constants for Segment 1. - (All units Per Day)"
"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
.7, 1.16, 3.846, 4.993, .25, .583, 0, 0

"Output for Segment 1"

"Segment starts at LOWER JACKSON RIVER WWTP"

"Total", "Segm."
"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 5.62, 13.882, .228
.1, .1, 5.557, 13.746, .227
.2, .2, 5.498, 13.611, .226
.3, .3, 5.443, 13.477, .225
.4, .4, 5.391, 13.345, .224
.5, .5, 5.343, 13.214, .223
.6, .6, 5.298, 13.084, .222
.7, .7, 5.256, 12.955, .221
.78, .78, 5.225, 12.853, .22

"Discharge/Tributary Input Data for Segment 2"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
36.2, 2, 0, .6.611, 31

"Incremental Flow Input Data for Segment 2"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.922, 5, 1.1, .6.611, 31

"Hydraulic Information for Segment 2"

"Length", "width", "Depth", "Velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
.76, 155.001, 1.78, .69

modout LJR - mannings ok at 26

"Initial Mix Values for Segment 2"
 "Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 170.058, 5.528, 11.179, .172, 7.346, 31

"Rate Constants for Segment 2. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .7, 1.16, 3.947, 5.124, .25, .583, 0, 0

"Output for Segment 2"
 "Segment starts at COWPASTURE RIVER"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 .78, 0, 5.528, 11.179, .172
 .88, .1, 5.496, 11.065, .171
 .98, .2, 5.467, 10.952, .17
 1.08, .3, 5.44, 10.84, .169
 1.18, .4, 5.415, 10.729, .168
 1.28, .5, 5.393, 10.619, .167
 1.38, .6, 5.373, 10.51, .166
 1.48, .7, 5.355, 10.403, .165
 1.54, .76, 5.345, 10.339, .164

"Discharge/Tributary Input Data for Segment 3"
 "Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .5, 2, 0, 6.612, 31

"Incremental Flow Input Data for Segment 3"
 "Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 0, 5, 1.1, 6.614, 31

"Hydraulic Information for Segment 3"
 "Length", "Width", "Depth", "velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 2.88, 155.001, 1.784, .615

"Initial Mix Values for Segment 3"
 "Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 170.558, 5.349, 10.323, .164, 7.348, 31

"Rate Constants for Segment 3. - (All units Per Day)"
 "k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .7, 1.16, 3.125, 4.056, .25, .583, 0, 0

"Output for Segment 3"
 "Segment starts at LICK RUN"
 "Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 1.54, 0, 5.349, 10.323, .164
 1.64, .1, 5.311, 10.205, .163
 1.74, .2, 5.276, 10.088, .162
 1.84, .3, 5.244, 9.972, .161
 1.94, .4, 5.214, 9.858, .16
 2.04, .5, 5.187, 9.745, .159
 2.14, .6, 5.162, 9.633, .158

modout LJR - mannings ok at 26

2.24,	.7,	5.139,	9.523,	.157
2.34,	.8,	5.118,	9.414,	.156
2.44,	.9,	5.099,	9.306,	.155
2.54,	1,	5.082,	9.199,	.154
2.64,	1.1,	5.067,	9.094,	.153
2.74,	1.2,	5.054,	8.99,	.152
2.84,	1.3,	5.043,	8.887,	.151
2.94,	1.4,	5.033,	8.785,	.15
3.04,	1.5,	5.025,	8.684,	.149
3.14,	1.6,	5.018,	8.584,	.148
3.24,	1.7,	5.013,	8.486,	.147
3.34,	1.8,	5.009,	8.389,	.146
3.44,	1.9,	5.006,	8.293,	.145
3.54,	2,	5.005,	8.198,	.144
3.64,	2.1,	5.005,	8.104,	.143
3.74,	2.2,	5.006,	8.011,	.142
3.84,	2.3,	5.008,	7.919,	.141
3.94,	2.4,	5.011,	7.828,	.14
4.04,	2.5,	5.015,	7.738,	.139
4.14,	2.6,	5.019,	7.649,	.138
4.24,	2.7,	5.024,	7.561,	.137
4.34,	2.8,	5.03,	7.474,	.136
4.42,	2.88,	5.035,	7.405,	.135

"Discharge/Tributary Input Data for Segment 4"

"Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 .02, 30, 15, ,5, 31

"Incremental Flow Input Data for Segment 4"

"Flow", "cBOD5", "TKN", "DO", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 0, 5, 1.1, ,6.616, 31

"Hydraulic Information for Segment 4"

"Length", "Width", "Depth", "Velocity"
 "(mi)", "(ft)", "(ft)", "(ft/sec)"
 1.1, 160.003, 1.821, .582

"Initial Mix Values for Segment 4"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
 "(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
 170.578, 5.035, 7.413, .141, 7.351, 31

"Rate Constants for Segment 4. - (All units Per Day)"

"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
 .5, .829, 2.727, 3.54, .25, .583, 0, 0

"Output for Segment 4"

"Segment starts at GLEN WILTON STP"

"Total", "Segm."
 "Dist.", "Dist.", "DO", "cBOD", "nBOD"
 "(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
 4.42, 0, 5.035, 7.413, .141
 4.52, .1, 5.056, 7.349, .14
 4.62, .2, 5.076, 7.285, .139
 4.72, .3, 5.096, 7.222, .138
 4.82, .4, 5.116, 7.159, .137
 4.92, .5, 5.136, 7.097, .136
 5.02, .6, 5.156, 7.036, .135

modout LJR - manning's ok at 26

5.12,	.7,	5.175,	6.975,	.134
5.22,	.8,	5.194,	6.915,	.133
5.32,	.9,	5.213,	6.855,	.132
5.42,	1,	5.232,	6.796,	.131
5.52,	1.1,	5.251,	6.737,	.13

"Discharge/Tributary Input Data for Segment 5"

"Flow",	"CBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
.24,	2,	0,	,6.617,	31

"Incremental Flow Input Data for Segment 5"

"Flow",	"CBOD5",	"TKN",	"DO",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
0,	5,	1.1,	,6.622,	31

"Hydraulic Information for Segment 5"

"Length",	"Width",	"Depth",	"Velocity"	
"(mi)",	"(ft)",	"(ft)",	"(ft/sec)"	
6.24,	149.998,	1.685,	.673	

"Initial Mix values for Segment 5"

"Flow",	"DO",	"CBOD",	"nBOD",	"dosat",	"Temp"
"(mgd)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"(mg/l)",	"deg C"
170.818,	5.253,	6.735,	.13,	7.357,	31

"Rate Constants for Segment 5. - (All units Per Day)"

"k1",	"k1@T",	"k2",	"k2@T",	"kn",	"kn@T",	"BD",	"BD@T"
.5,	.829,	4.038,	5.242,	.25,	.583,	0,	0

"Output for Segment 5"

"Segment starts at BIG CREEK"

"Total",	"Segm."				
"Dist.",	"Dist.",	"DO",	"CBOD",	"nBOD"	
"(mi)",	"(mi)",	"(mg/l)",	"(mg/l)",	"(mg/l)"	
5.52,	0,	5.253,	6.735,	.13	
5.62,	.1,	5.301,	6.685,	.129	
5.72,	.2,	5.347,	6.635,	.128	
5.82,	.3,	5.391,	6.585,	.127	
5.92,	.4,	5.434,	6.536,	.126	
6.02,	.5,	5.475,	6.487,	.125	
6.12,	.6,	5.514,	6.438,	.124	
6.22,	.7,	5.552,	6.39,	.123	
6.32,	.8,	5.589,	6.342,	.122	
6.42,	.9,	5.624,	6.294,	.121	
6.52,	1,	5.658,	6.247,	.12	
6.62,	1.1,	5.691,	6.2,	.119	
6.72,	1.2,	5.722,	6.154,	.118	
6.82,	1.3,	5.752,	6.108,	.117	
6.92,	1.4,	5.781,	6.062,	.116	
7.02,	1.5,	5.809,	6.017,	.115	
7.12,	1.6,	5.836,	5.972,	.114	
7.22,	1.7,	5.862,	5.927,	.113	
7.32,	1.8,	5.888,	5.883,	.112	
7.42,	1.9,	5.913,	5.839,	.111	
7.52,	2,	5.937,	5.795,	.11	
7.62,	2.1,	5.96,	5.752,	.109	
7.72,	2.2,	5.982,	5.709,	.108	
7.82,	2.3,	6.004,	5.666,	.107	
7.92,	2.4,	6.025,	5.624,	.106	

modout LJR - mannings ok at 26

8.02,	2.5,	6.045,	5.582,	.105
8.12,	2.6,	6.065,	5.54,	.104
8.22,	2.7,	6.084,	5.498,	.103
8.32,	2.8,	6.102,	5.457,	.102
8.42,	2.9,	6.12,	5.416,	.101
8.52,	3,	6.137,	5.375,	.1
8.62,	3.1,	6.154,	5.335,	.099
8.72,	3.2,	6.17,	5.295,	.098
8.82,	3.3,	6.186,	5.255,	.097
8.92,	3.4,	6.201,	5.216,	.096
9.02,	3.5,	6.216,	5.177,	.095
9.12,	3.6,	6.231,	5.138,	.094
9.22,	3.7,	6.245,	5.099,	.094
9.32,	3.8,	6.259,	5.061,	.094
9.42,	3.9,	6.273,	5.023,	.094
9.52,	4,	6.286,	5,	.094
9.62,	4.1,	6.335,	5,	.094
9.72,	4.2,	6.382,	5,	.094
9.82,	4.3,	6.427,	5,	.094
9.92,	4.4,	6.47,	5,	.094
10.02,	4.5,	6.511,	5,	.094
10.12,	4.6,	6.55,	5,	.094
10.22,	4.7,	6.587,	5,	.094
10.32,	4.8,	6.622,	5,	.094
10.42,	4.9,	6.622,	5,	.094
10.52,	5,	6.622,	5,	.094
10.62,	5.1,	6.622,	5,	.094
10.72,	5.2,	6.622,	5,	.094
10.82,	5.3,	6.622,	5,	.094
10.92,	5.4,	6.622,	5,	.094
11.02,	5.5,	6.622,	5,	.094
11.12,	5.6,	6.622,	5,	.094
11.22,	5.7,	6.622,	5,	.094
11.32,	5.8,	6.622,	5,	.094
11.42,	5.9,	6.622,	5,	.094
11.52,	6,	6.622,	5,	.094
11.62,	6.1,	6.622,	5,	.094
11.72,	6.2,	6.622,	5,	.094
11.76,	6.24,	6.622,	5,	.094

"END OF FILE"

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to JACKSON - JAMES RIVER.**

File Information

File Name: C:\water\Models\stream model\model runs\lower Jackson\5 segments using
Date Modified: April 04, 2006

Water Quality Standards Information

Stream Name: JACKSON - JAMES RIVER
River Basin: James River Basin
Section: 12
Class: IV - Mountainous Zones Waters
Special Standards: none

Background Flow Information

Gauge Used: James River at Lick Run
Gauge Drainage Area: 1373 Sq.Mi.
Gauge 7Q10 Flow: 168.7 MGD
Headwater Drainage Area: 904.5 Sq.Mi.
Headwater 7Q10 Flow: 129.436 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 18.3 MGD
Incremental Flow in Segments: 0.1228696 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 31 Degrees C
Background cBOD5: 5 mg/l
Background TKN: 1.1 mg/l
Background D.O.: 5.609402 mg/l

Model Segmentation

Number of Segments: 5
Model Start Elevation: 995 ft above MSL
Model End Elevation: 923 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to JACKSON - JAMES RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition: A discharge enters.
Discharge Name: LOWER JACKSON RIVER WWTP
VPDES Permit No.:

Discharger Flow Information

Flow: 3.5 MGD
cBOD5: 26 mg/l
TKN: 5 mg/l
D.O.: 6 mg/l
Temperature: 31 Degrees C

Geographic Information

Segment Length: 0.78 miles
Upstream Drainage Area: 904.5 Sq.Mi.
Downstream Drainage Area: 912 Sq.Mi.
Upstream Elevation: 995 Ft.
Downstream Elevation: 990 Ft.

Hydraulic Information

Segment Width: 147.999 Ft.
Segment Depth: 1.935 Ft.
Segment Velocity: 0.718 Ft./Sec.
Segment Flow: 132.936 MGD
Incremental Flow: 0.922 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to JACKSON - JAMES RIVER.**

Segment Information for Segment 2

Definition Information

Segment Definition: A tributary enters.
Tributary Name: COWPASTURE RIVER

Tributary Flow Information

Flow: 36.2 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 6.611 mg/l
Temperature: 31 Degrees C

Geographic Information

Segment Length: 0.76 miles
Upstream Drainage Area: 1373 Sq.Mi.
Downstream Drainage Area: 1373 Sq.Mi.
Upstream Elevation: 990 Ft.
Downstream Elevation: 985 Ft.

Hydraulic Information

Segment Width: 155.001 Ft.
Segment Depth: 1.78 Ft.
Segment Velocity: 0.69 Ft./Sec.
Segment Flow: 169.136 MGD
Incremental Flow: 0 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Ripple: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to JACKSON - JAMES RIVER.

Segment Information for Segment 3

Definition Information

Segment Definition: A tributary enters.
Tributary Name: LICK RUN

Tributary Flow Information

Flow: 0.5 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 6.612 mg/l
Temperature: 31 Degrees C

Geographic Information

Segment Length: 2.88 miles
Upstream Drainage Area: 1377 Sq.Mi.
Downstream Drainage Area: 1377 Sq.Mi.
Upstream Elevation: 985 Ft.
Downstream Elevation: 970 Ft.

Hydraulic Information

Segment Width: 155.001 Ft.
Segment Depth: 1.784 Ft.
Segment Velocity: 0.615 Ft./Sec.
Segment Flow: 169.636 MGD
Incremental Flow: 0 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Ripple: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: On Entire Bottom

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to JACKSON - JAMES RIVER.

Segment Information for Segment 4

Definition Information

Segment Definition: A discharge enters.
Discharge Name: GLEN WILTON STP
VPDES Permit No.:

Discharger Flow Information

Flow: 0.02 MGD
cBOD5: 30 mg/l
TKN: 15 mg/l
D.O.: 5 mg/l
Temperature: 31 Degrees C

Geographic Information

Segment Length: 1.1 miles
Upstream Drainage Area: 1378 Sq.Mi.
Downstream Drainage Area: 1378 Sq.Mi.
Upstream Elevation: 970 Ft.
Downstream Elevation: 965 Ft.

Hydraulic Information

Segment Width: 160.003 Ft.
Segment Depth: 1.821 Ft.
Segment Velocity: 0.582 Ft./Sec.
Segment Flow: 169.656 MGD
Incremental Flow: 0 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Riffle: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: Only On Edges

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to JACKSON - JAMES RIVER.

Segment Information for Segment 5

Definition Information

Segment Definition: A tributary enters.
Tributary Name: BIG CREEK

Tributary Flow Information

Flow: 0.24 MGD
cBOD5: 2 mg/l
TKN: 0 mg/l
D.O.: 6.617 mg/l
Temperature: 31 Degrees C

Geographic Information

Segment Length: 6.24 miles
Upstream Drainage Area: 1378 Sq.Mi.
Downstream Drainage Area: 1416 Sq.Mi.
Upstream Elevation: 965 Ft.
Downstream Elevation: 923 Ft.

Hydraulic Information

Segment Width: 149.998 Ft.
Segment Depth: 1.685 Ft.
Segment Velocity: 0.673 Ft./Sec.
Segment Flow: 169.896 MGD
Incremental Flow: 4.669 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Mostly Straight
Pool and Ripple: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: Only On Edges

Table 7-7: Phosphorus Waste Load Allocations - Major Dischargers						
Facility Name	VPDES Permit	Discharge Flow (MGD)	TP Conc. (mg/L)	TP Load Allocation (lbs/growing season)	PO4-P Conc. (mg/L)	PO4-P Load Allocation (lbs/growing season)
MeadWestvaco	VA0003646	35	1.5	66,991	0.21*	9,379
Covington STP	VA0025542	3	0.5	1,914	0.335	1,282
Low Moor WWTP	VA0027979	0.3	1.15	440	0.7705	295
Lower Jackson River WWTP	VA0090671	2.6	0.5	1,659	0.335	1,111
Total			71,004	-	12,068	

*Measured as filtered orthophosphorus

Table 7-8: Total Nitrogen Waste Load Allocations During the Growing Season Major Dischargers				
Facility Name	VPDES Permit	Discharge Flow (MGD)	TN Conc. (mg/L)	TN Load (lbs/growing season)
MeadWestvaco	VA0003646	35	3.7	165,245
Covington STP	VA0025542	3	6	22,968
Low Moor WWTP	VA0027979	0.3	14	5,359
Lower Jackson River WWTP	VA0090671	2.6	6	19,906
Total			213,478	

The allocation for Low Moor WWTP and Lower Jackson River WWTP reflect the aggregated mass load nutrient given to Alleghany County pursuant to 9VAC 25-820-70, Part 1.B.2, otherwise referred to as a "bubble". Accordingly, compliance is determined solely on an aggregate basis rather than by comparison of individual facility waste load allocations.

In addition to the major dischargers, there are 9 active minor facilities holding active individual discharge permits in the Jackson River watershed (4 industrial facilities and 5 municipal facilities). The 4 minor industrial facilities discharge very low level of nutrients. Based on DMR data for a few industrial facilities, the average discharge TP is approximated at 0.34 mg/L and 0.14 mg/l for total nitrogen and total phosphorus, respectively. **Table 7-9** presents the WLAs for the 4 minor industrial facilities for total phosphorus and total nitrogen respectively.

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Lower Jackson River Regional WWTP 2.6 MGD

Permit No.: VA0090671

Receiving Stream: Jackson River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information				Effluent Information			
Mean Hardness (as CaCO ₃) =	139 mg/L	1Q10 (Annual) =	119 MGD	Annual - 1Q10 Mix =	20.37 %	- 7Q10 Mix =	100 %	Mean Hardness (as CaCO ₃) =	131 mg/L		
90% Temperature (Annual) =	23.5 deg C	7Q10 (Annual) =	129 MGD	- 30Q10 Mix =	100 %	90% Temp (Annual) =	24.4 deg C	90% Temp (Wet season) =	23 deg C		
90% Temperature (Wet season) =	14.2 deg C	30Q10 (Annual) =	141 MGD	Wet Season - 1Q10 Mix =	20.37 %	90% Maximum pH =	8.2 SU	10% Maximum pH =	7 SU		
90% Maximum pH =	8.1 SU	1Q10 (Wet season) =	154 MGD	- 30Q10 Mix =	100 %	Discharge Flow =	2.6 MGD				
10% Maximum pH =	6.5 SU	30Q10 (Wet season) =	182 MGD								
Tier Designation (1 or 2) =	2	30Q5 =	156 MGD								
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	353 MGD								
Trout Present Y/N? =	n										
Early Life Stages Present Y/N? =	y										

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	6.0E+04	--	--	na	9.9E+01	--	--	na	6.0E+03	--	--	na	6.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	5.7E+02	--	--	na	9.3E-01	--	--	na	5.7E+01	--	--	na	5.7E+01
Acrylonitrile ^c	0	--	--	na	2.5E+00	--	--	na	3.4E+02	--	--	na	2.5E-01	--	--	na	3.4E+01	--	--	na	3.4E+01
Aldrin ^c	0	3.0E+00	--	na	5.0E-04	3.1E+01	--	na	6.8E-02	7.5E-01	--	na	5.0E-05	3.5E+01	--	na	6.8E-03	3.1E+01	--	na	6.8E-03
Ammonia-N (mg/l) (Yearly)	0.1	6.83E+00	1.17E+00	na	--	6.96E+01	5.93E+01	na	--	1.81E+00	3.68E-01	na	--	7.99E+01	1.49E+01	na	--	6.96E+01	1.49E+01	na	--
Ammonia-N (mg/l) (High Flow)	0.1	6.86E+00	2.09E+00	na	--	8.84E+01	1.42E+02	na	--	1.81E+00	5.98E-01	na	--	1.03E+02	3.55E+01	na	--	8.84E+01	3.55E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	2.4E+06	--	--	na	4.0E+03	--	--	na	2.4E+05	--	--	na	2.4E+05
Antimony	0	--	--	na	6.4E+02	--	--	na	3.9E+04	--	--	na	6.4E+01	--	--	na	3.9E+03	--	--	na	3.9E+03
Arsenic	3.4E+02	1.5E+02	na	--	3.5E+03	7.6E+03	na	--	8.5E+01	3.8E+01	na	--	4.0E+03	1.9E+03	na	--	3.5E+03	1.9E+03	na	--	
Barium	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	na	--	--
Benzene ^c	0	--	--	na	5.1E+02	--	--	na	7.0E+04	--	--	na	5.1E+01	--	--	na	7.0E+03	--	--	na	7.0E+03
Benzidine ^c	0	--	--	na	2.0E-03	--	--	na	2.7E-01	--	--	na	2.0E-04	--	--	na	2.7E-02	--	--	na	2.7E-02
Benzo (a) anthracene ^c	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	--	--	na	2.5E+00
Benzo (b) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	--	--	na	2.5E+00
Benzo (k) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	--	--	na	2.5E+00
Benzo (a) pyrene ^c	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	--	--	na	2.5E+00
Bis2-Chloroethyl Ether ^c	0	--	--	na	5.3E+00	--	--	na	7.2E+02	--	--	na	5.3E-01	--	--	na	7.2E+01	--	--	na	7.2E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	4.0E+06	--	--	na	6.5E+03	--	--	na	4.0E+05	--	--	na	4.0E+05
Bis 2-Ethylhexyl Phthalate ^c	0	--	--	na	2.2E+01	--	--	na	3.0E+03	--	--	na	2.2E+00	--	--	na	3.0E+02	--	--	na	3.0E+02
Bromoform ^c	0	--	--	na	1.4E+03	--	--	na	1.9E+05	--	--	na	1.4E+02	--	--	na	1.9E+04	--	--	na	1.9E+04
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.2E+05	--	--	na	1.9E+02	--	--	na	1.2E+04	--	--	na	1.2E+04
Cadmium	0	5.7E+00	1.5E+00	na	--	5.8E+01	7.4E+01	na	--	1.4E+00	3.7E-01	na	--	6.6E+01	1.9E+01	na	--	5.8E+01	1.9E+01	na	--
Carbon Tetrachloride ^c	0	--	--	na	1.6E+01	--	--	na	2.2E+03	--	--	na	1.6E+00	--	--	na	2.2E+02	--	--	na	2.2E+02
Chlordane ^c	0	2.4E+00	4.3E-03	na	8.1E-03	2.5E+01	2.2E-01	na	1.1E+00	6.0E-01	1.1E-03	na	8.1E-04	2.8E+01	5.4E-02	na	1.1E-01	2.5E+01	5.4E-02	na	1.1E-01
Chloride	0	8.6E+05	2.3E+05	na	--	8.9E+06	1.2E+07	na	--	2.2E+05	5.8E+04	na	--	1.0E+07	2.9E+06	na	--	8.9E+06	2.9E+06	na	--
TRC	0	1.9E+01	1.1E+01	na	--	2.0E+02	5.6E+02	na	--	4.8E+00	2.8E+00	na	--	2.2E+02	1.4E+02	na	--	2.0E+02	1.4E+02	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	9.8E+04	--	--	na	1.6E+02	--	--	na	9.8E+03	--	--	na	9.8E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Chlorodibromomethane ^c	0	--	--	na	1.3E+02	--	--	na	1.8E+04	--	--	na	1.3E+01	--	--	na	1.8E+03	--	--	na	1.8E+03	
Chloroform	0	--	--	na	1.1E+04	--	--	na	6.7E+05	--	--	na	1.1E+03	--	--	na	6.7E+04	--	--	na	6.7E+04	
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	9.8E+04	--	--	na	1.6E+02	--	--	na	9.8E+03	--	--	na	9.8E+03	
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	9.2E+03	--	--	na	1.5E+01	--	--	na	9.2E+02	--	--	na	9.2E+02	
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.6E-01	2.1E+00	na	--	2.1E-02	1.0E-02	na	--	9.7E-01	5.2E-01	na	--	8.6E-01	5.2E-01	na	--	
Chromium III	0	7.4E+02	9.7E+01	na	--	7.7E+03	4.9E+03	na	--	1.9E+02	2.4E+01	na	--	8.7E+03	1.2E+03	na	--	7.7E+03	1.2E+03	na	--	
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.7E+02	5.6E+02	na	--	4.0E+00	2.8E+00	na	--	1.9E+02	1.4E+02	na	--	1.7E+02	1.4E+02	na	--	
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	1.0E+01	--	--	--	--	6.1E+02	--	--	na	--	
Chrysene ^c	0	--	--	na	1.8E-02	--	--	na	2.5E+00	--	--	na	1.8E-03	--	--	na	2.5E-01	--	--	na	2.5E-01	
Copper	0	1.8E+01	1.2E+01	na	--	1.9E+02	6.0E+02	na	--	4.6E+00	3.0E+00	na	--	2.1E+02	1.5E+02	na	--	1.9E+02	1.5E+02	na	--	
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.3E+02	2.6E+02	na	9.8E+05	5.5E+00	1.3E+00	na	1.6E+03	2.6E+02	6.6E+01	na	9.8E+04	2.3E+02	6.6E+01	na	9.8E+04	
DDD ^c	0	--	--	na	3.1E-03	--	--	na	4.2E-01	--	--	na	3.1E-04	--	--	na	4.2E-02	--	--	na	4.2E-02	
DDE ^c	0	--	--	na	2.2E-03	--	--	na	3.0E-01	--	--	na	2.2E-04	--	--	na	3.0E-02	--	--	na	3.0E-02	
DDT ^c	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+01	5.1E-02	na	3.0E-01	2.8E-01	2.5E-04	na	2.2E-04	1.3E+01	1.3E-02	na	3.0E-02	1.1E+01	1.3E-02	na	3.0E-02	
Demeton	0	--	--	1.0E-01	na	--	--	5.1E+00	na	--	--	2.5E-02	na	--	--	1.3E+00	na	--	--	1.3E+00	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.8E+00	8.6E+00	na	--	4.3E-02	4.3E-02	na	--	2.0E+00	2.2E+00	na	--	1.8E+00	2.2E+00	na	--	
Dibenz(a,h)anthracene ^c	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	--	--	na	2.5E+00	
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	7.9E+04	--	--	na	1.3E+02	--	--	na	7.9E+03	--	--	na	7.9E+03	
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	5.9E+04	--	--	na	9.6E+01	--	--	na	5.9E+03	--	--	na	5.9E+03	
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.2E+04	--	--	na	1.9E+01	--	--	na	1.2E+03	--	--	na	1.2E+03	
3,3-Dichlorobenzidine ^c	0	--	--	na	2.8E-01	--	--	na	3.8E+01	--	--	na	2.8E-02	--	--	na	3.8E+00	--	--	na	3.8E+00	
Dichlorobromomethane ^c	0	--	--	na	1.7E+02	--	--	na	2.3E+04	--	--	na	1.7E+01	--	--	na	2.3E+03	--	--	na	2.3E+03	
1,2-Dichloroethane ^c	0	--	--	na	3.7E+02	--	--	na	5.1E+04	--	--	na	3.7E+01	--	--	na	5.1E+03	--	--	na	5.1E+03	
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	4.3E+05	--	--	na	7.1E+02	--	--	na	4.3E+04	--	--	na	4.3E+04	
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	6.1E+05	--	--	na	1.0E+03	--	--	na	6.1E+04	--	--	na	6.1E+04	
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	1.8E+04	--	--	na	2.9E+01	--	--	na	1.8E+03	--	--	na	1.8E+03	
2,4-Dichlorophenoxyacetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	
1,2-Dichloropropane ^c	0	--	--	na	1.5E+02	--	--	na	2.1E+04	--	--	na	1.5E+01	--	--	na	2.1E+03	--	--	na	2.1E+03	
1,3-Dichloropropene ^c	0	--	--	na	2.1E+02	--	--	na	2.9E+04	--	--	na	2.1E+01	--	--	na	2.9E+03	--	--	na	2.9E+03	
Dieldrin ^c	0	2.4E-01	5.6E-02	na	5.4E-04	2.5E+00	2.8E+00	na	7.4E-02	6.0E-02	1.4E-02	na	5.4E-05	2.8E+00	7.1E-01	na	7.4E-03	2.5E+00	7.1E-01	na	7.4E-03	
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	2.7E+06	--	--	na	4.4E+03	--	--	na	2.7E+05	--	--	na	2.7E+05	
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	5.2E+04	--	--	na	8.5E+01	--	--	na	5.2E+03	--	--	na	5.2E+03	
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	6.7E+07	--	--	na	1.1E+05	--	--	na	6.7E+06	--	--	na	6.7E+06	
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	2.7E+05	--	--	na	4.5E+02	--	--	na	2.7E+04	--	--	na	2.7E+04	
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	3.2E+05	--	--	na	5.3E+02	--	--	na	3.2E+04	--	--	na	3.2E+04	
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	1.7E+04	--	--	na	2.8E+01	--	--	na	1.7E+03	--	--	na	1.7E+03	
2,4-Dinitrotoluene ^c	0	--	--	na	3.4E+01	--	--	na	4.7E+03	--	--	na	3.4E+00	--	--	na	4.7E+02	--	--	na	4.7E+02	
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	3.1E-06	--	--	na	5.1E-09	--	--	na	3.1E-07	--	--	na	3.1E-07	
1,2-Diphenylhydrazine ^c	0	--	--	na	2.0E+00	--	--	na	2.7E+02	--	--	na	2.0E-01	--	--	na	2.7E+01	--	--	na	2.7E+01	
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.3E+00	2.8E+00	na	5.4E+03	5.5E-02	1.4E-02	na	8.9E+00	2.6E+00	7.1E-01	na	5.4E+02	2.3E+00	7.1E-01	na	5.4E+02	
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.3E+00	2.8E+00	na	5.4E+03	5.5E-02	1.4E-02	na	8.9E+00	2.6E+00	7.1E-01	na	5.4E+02	2.3E+00	7.1E-01	na	5.4E+02	
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.3E+00	2.8E+00	--	--	5.5E-02	1.4E-02	--	--	2.6E+00	7.1E-01	--	--	2.3E+00	7.1E-01	--	--	
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	5.4E+03	--	--	na	8.9E+00	--	--	na	5.4E+02	--	--	na	5.4E+02	
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.9E-01	1.8E+00	na	3.7E+00	2.2E-02	9.0E-03	na	6.0E-03	1.0E+00	4.6E-01	na	3.7E-01	8.9E-01	4.6E-01	na	3.7E-01	
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	1.8E+01	--	--	na	3.0E-02	--	--	na	1.8E+00	--	--	na	1.8E+00	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	1.3E+05	--	--	na	2.1E+02	--	--	na	1.3E+04	--	--	na	1.3E+04
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	8.5E+03	--	--	na	1.4E+01	--	--	na	8.5E+02	--	--	na	8.5E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	3.2E+05	--	--	na	5.3E+02	--	--	na	3.2E+04	--	--	na	3.2E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	5.1E-01	na	--	--	2.5E-03	na	--	--	1.3E-01	na	--	--	1.3E-01	na	--
Heptachlor C	0	5.2E-01	3.8E-03	na	7.9E-04	5.4E+00	1.9E-01	na	1.1E-01	1.3E-01	9.5E-04	na	7.9E-05	6.1E+00	4.8E-02	na	1.1E-02	5.4E+00	4.8E-02	na	1.1E-02
Heptachlor Epoxide C	0	5.2E-01	3.8E-03	na	3.9E-04	5.4E+00	1.9E-01	na	5.3E-02	1.3E-01	9.5E-04	na	3.9E-05	6.1E+00	4.8E-02	na	5.3E-03	5.4E+00	4.8E-02	na	5.3E-03
Hexachlorobenzene C	0	--	--	na	2.9E-03	--	--	na	4.0E-01	--	--	na	2.9E-04	--	--	na	4.0E-02	--	--	na	4.0E-02
Hexachlorobutadiene C	0	--	--	na	1.8E+02	--	--	na	2.5E+04	--	--	na	1.8E+01	--	--	na	2.5E+03	--	--	na	2.5E+03
Hexachlorocyclohexane																					
Alpha-BHC C	0	--	--	na	4.9E-02	--	--	na	6.7E+00	--	--	na	4.9E-03	--	--	na	6.7E-01	--	--	na	6.7E-01
Hexachlorocyclohexane																					
Beta-BHC C	0	--	--	na	1.7E-01	--	--	na	2.3E+01	--	--	na	1.7E-02	--	--	na	2.3E+00	--	--	na	2.3E+00
Hexachlorocyclohexane																					
Gamma-BHC C (Lindane)	0	9.5E-01	na	na	1.8E+00	9.8E+00	--	na	2.5E+02	2.4E-01	--	na	1.8E-01	1.1E+01	--	na	2.5E+01	9.8E+00	--	na	2.5E+01
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	6.7E+04	--	--	na	1.1E+02	--	--	na	6.7E+03	--	--	na	6.7E+03
Hexachloroethane C	0	--	--	na	3.3E+01	--	--	na	4.5E+03	--	--	na	3.3E+00	--	--	na	4.5E+02	--	--	na	4.5E+02
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	1.0E+02	na	--	--	5.0E-01	na	--	--	2.5E+01	na	--	--	2.5E+01	na	--
Indeno (1,2,3-cd) pyrene C	0	--	--	na	1.8E-01	--	--	na	2.5E+01	--	--	na	1.8E-02	--	--	na	2.5E+00	--	--	na	2.5E+00
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Isophorone C	0	--	--	na	9.6E+03	--	--	na	1.3E+06	--	--	na	9.6E+02	--	--	na	1.3E+05	--	--	na	1.3E+05
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Lead	0	1.8E+02	2.1E+01	na	--	1.9E+03	1.0E+03	na	--	4.5E+01	5.1E+00	na	--	2.1E+03	2.6E+02	na	--	1.9E+03	2.6E+02	na	--
Malathion	0	--	1.0E-01	na	--	--	5.1E+00	na	--	--	2.5E-02	na	--	--	1.3E+00	na	--	--	1.3E+00	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+01	3.9E+01	--	--	3.5E-01	1.9E-01	--	--	1.6E+01	9.7E+00	--	--	1.4E+01	9.7E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	9.2E+04	--	--	na	1.5E+02	--	--	na	9.2E+03	--	--	na	9.2E+03
Methylene Chloride C	0	--	--	na	5.9E+03	--	--	na	8.1E+05	--	--	na	5.9E+02	--	--	na	8.1E+04	--	--	na	8.1E+04
Methoxychlor	0	--	3.0E-02	na	--	--	1.5E+00	na	--	--	7.5E-03	na	--	--	3.8E-01	na	--	--	3.8E-01	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Nickel	0	2.4E+02	2.7E+01	na	4.6E+03	2.5E+03	1.4E+03	na	2.8E+05	6.0E+01	6.7E+00	na	4.6E+02	2.8E+03	3.4E+02	na	2.8E+04	2.5E+03	3.4E+02	na	2.8E+04
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	4.2E+04	--	--	na	6.9E+01	--	--	na	4.2E+03	--	--	na	4.2E+03
N-Nitrosodimethylamine C	0	--	--	na	3.0E+01	--	--	na	4.1E+03	--	--	na	3.0E+00	--	--	na	4.1E+02	--	--	na	4.1E+02
N-Nitrosodiphenylamine C	0	--	--	na	6.0E+01	--	--	na	8.2E+03	--	--	na	6.0E+00	--	--	na	8.2E+02	--	--	na	8.2E+02
N-Nitrosodi-n-propylamine C	0	--	--	na	5.1E+00	--	--	na	7.0E+02	--	--	na	5.1E-01	--	--	na	7.0E+01	--	--	na	7.0E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.9E+02	3.3E+02	na	--	7.0E+00	1.7E+00	--	--	3.3E+02	8.4E+01	--	--	2.9E+02	8.4E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.7E-01	6.6E-01	na	--	1.6E-02	3.3E-03	na	--	7.6E-01	1.6E-01	na	--	6.7E-01	1.6E-01	na	--
PCB Total C	0	--	1.4E-02	na	6.4E-04	--	7.1E-01	na	8.8E-02	--	3.5E-03	na	6.4E-05	--	1.8E-01	na	8.8E-03	--	1.8E-01	na	8.8E-03
Pentachlorophenol C	0	5.4E+00	4.1E+00	na	3.0E+01	5.6E+01	2.1E+02	na	4.1E+03	1.3E+00	1.0E+00	na	3.0E+00	6.2E+01	5.2E+01	na	4.1E+02	5.6E+01	5.2E+01	na	4.1E+02
Phenol	0	--	--	na	8.6E+05	--	--	na	5.2E+07	--	--	na	8.6E+04	--	--	na	5.2E+06	--	--	na	5.2E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	2.4E+05	--	--	na	4.0E+02	--	--	na	2.4E+04	--	--	na	2.4E+04
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.1E+02	2.5E+02	na	2.6E+05	5.0E+00	1.3E+00	na	4.2E+02	2.3E+02	6.3E+01	na	2.6E+04	2.1E+02	6.3E+01	na	2.6E+04
Silver	0	6.0E+00	--	na	--	6.2E+01	--	na	--	1.5E+00	--	na	--	7.1E+01	--	na	--	6.2E+01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	5.5E+03	--	--	na	4.0E+00	--	--	na	5.5E+02	--	--	na	5.5E+02
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	4.5E+03	--	--	na	3.3E+00	--	--	na	4.5E+02	--	--	na	4.5E+02
Thallium	0	--	--	na	4.7E-01	--	--	na	2.9E+01	--	--	na	4.7E-02	--	--	na	2.9E+00	--	--	na	2.9E+00
Toluene	0	--	--	na	6.0E+03	--	--	na	3.7E+05	--	--	na	6.0E+02	--	--	na	3.7E+04	--	--	na	3.7E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	7.5E+00	1.0E-02	na	3.8E-01	1.8E-01	5.0E-05	na	2.8E-04	8.5E+00	2.5E-03	na	3.8E-02	7.5E+00	2.5E-03	na	3.8E-02
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.7E+00	3.6E+00	na	--	1.2E-01	1.8E-02	na	--	5.4E+00	9.1E-01	na	--	4.7E+00	9.1E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	4.3E+03	--	--	na	7.0E+00	--	--	na	4.3E+02	--	--	na	4.3E+02
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	2.2E+04	--	--	na	1.6E+01	--	--	na	2.2E+03	--	--	na	2.2E+03
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	4.1E+04	--	--	na	3.0E+01	--	--	na	4.1E+03	--	--	na	4.1E+03
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	3.3E+03	--	--	na	2.4E+00	--	--	na	3.3E+02	--	--	na	3.3E+02
2-(2,4,5-Trichlorophenoxy)propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	3.3E+03	--	--	na	2.4E+00	--	--	na	3.3E+02	--	--	na	3.3E+02
Zinc	0	1.5E+02	1.6E+02	na	2.6E+04	1.6E+03	7.9E+03	na	1.6E+06	3.9E+01	3.9E+01	na	2.6E+03	1.8E+03	2.0E+03	na	1.6E+05	1.6E+03	2.0E+03	na	1.6E+05

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	3.9E+03
Arsenic	1.1E+03
Barium	na
Cadmium	1.1E+01
Chromium III	7.4E+02
Chromium VI	6.6E+01
Copper	7.5E+01
Iron	na
Lead	1.6E+02
Manganese	na
Mercury	5.8E+00
Nickel	2.0E+02
Selenium	3.8E+01
Silver	2.5E+01
Zinc	6.4E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

2.600 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD) 2.600				Ammonia - Dry Season - Acute	Ammonia - Dry Season - Chronic																											
Stream Flows <u>Allocated to Mix (MGD)</u> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Dry Season</th> <th>Wet Season</th> <th>Dry Season</th> <th>Wet Season</th> </tr> </thead> <tbody> <tr> <td>24.240</td> <td>31.370</td> <td>26.840</td> <td>33.970</td> </tr> <tr> <td>129.000</td> <td>N/A</td> <td>131.600</td> <td>N/A</td> </tr> <tr> <td>141.000</td> <td>182.000</td> <td>143.600</td> <td>184.600</td> </tr> <tr> <td>156.000</td> <td>N/A</td> <td>158.600</td> <td>N/A</td> </tr> <tr> <td>353.000</td> <td>N/A</td> <td>355.600</td> <td>N/A</td> </tr> <tr> <td>0.000</td> <td>N/A</td> <td>2.600</td> <td>N/A</td> </tr> </tbody> </table>				Dry Season	Wet Season	Dry Season	Wet Season	24.240	31.370	26.840	33.970	129.000	N/A	131.600	N/A	141.000	182.000	143.600	184.600	156.000	N/A	158.600	N/A	353.000	N/A	355.600	N/A	0.000	N/A	2.600	N/A	90th Percentile pH (SU) 8.109 (7.204 - pH) -0.905 (pH - 7.204) 0.905
Dry Season	Wet Season	Dry Season	Wet Season																													
24.240	31.370	26.840	33.970																													
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Dry Season	Wet Season	Dry Season	Wet Season																													
23.587	14.874																															
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Dry Season	Wet Season	Calculated	Formula Inputs																													
138.2	138.2																															
138.8	138.8																															
				Early LS Present Criterion (mg N/L) 1.171 Early LS Absent Criterion (mg N/L) 1.171 Early Life Stages Present? y Effective Criterion (mg N/L) 1.171																												
Ammonia - Wet Season - Acute <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Dry Season</th> <th>Wet Season</th> <th>Calculated</th> <th>Formula Inputs</th> </tr> </thead> <tbody> <tr> <td>23.519</td> <td>14.346</td> <td></td> <td></td> </tr> <tr> <td>23.516</td> <td>14.324</td> <td></td> <td></td> </tr> <tr> <td>8.102</td> <td>8.101</td> <td></td> <td></td> </tr> <tr> <td>8.102</td> <td>8.101</td> <td></td> <td></td> </tr> <tr> <td>6.506</td> <td>N/A</td> <td></td> <td></td> </tr> <tr> <td>6.506</td> <td>N/A</td> <td></td> <td></td> </tr> </tbody> </table>				Dry Season	Wet Season	Calculated	Formula Inputs	23.519	14.346			23.516	14.324			8.102	8.101			8.102	8.101			6.506	N/A			6.506	N/A			90th Percentile pH (SU) 8.107 (7.204 - pH) -0.903 (pH - 7.204) 0.903
Dry Season	Wet Season	Calculated	Formula Inputs																													
23.519	14.346																															
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6.506	N/A																															
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				Trout Present Criterion (mg N/L) 4.580 Trout Absent Criterion (mg N/L) 6.857 Trout Present? n Effective Criterion (mg N/L) 6.857																												
				90th Percentile Temp. (deg C) 14.324 90th Percentile pH (SU) 8.101 MIN 2.850 MAX 14.324																												
				(7.688 - pH) -0.413 (pH - 7.688) 0.413																												
				Early LS Present Criterion (mg N/L) 2.093 Early LS Absent Criterion (mg N/L) 2.120 Early Life Stages Present? y Effective Criterion (mg N/L) 2.093																												

2.600 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGD) 2.600				Ammonia - Dry Season - Acute	Ammonia - Dry Season - Chronic																											
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Dry Season	Wet Season	Dry Season	Wet Season																													
119.000	154.000	121.600	156.600																													
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Dry Season	Wet Season	Dry Season	Wet Season																													
23.519	14.346																															
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Dry Season	Wet Season	Calculated	Formula Inputs																													
138.829	138.829																															
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				90th Percentile pH (SU) 8.101 (7.204 - pH) -0.897 (pH - 7.204) 0.897																												
				Trout Present Criterion (mg N/L) 4.627 Trout Absent Criterion (mg N/L) 6.929 Trout Present? n Effective Criterion (mg N/L) 6.929																												
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7/5/2016 3:21:50 PM

Facility = Lower Jackson River Regional
Chemical = Ammonia for 2.6 MGD
Chronic averaging period = 30
WLAA = 69.6
WLAC = 14.9
Q.L. = 0.2
samples/mo. = 4
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Lower Jackson River Regional WWTP 3.5 MGD

Permit No.: VA0090671

Receiving Stream: Jackson River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO ₃) =	139 mg/L	1Q10 (Annual) =	119 MGD	Annual - 1Q10 Mix =	20.37 %	Mean Hardness (as CaCO ₃) =	131 mg/L
90% Temperature (Annual) =	23.5 deg C	7Q10 (Annual) =	129 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	24.4 deg C
90% Temperature (Wet season) =	14.2 deg C	30Q10 (Annual) =	141 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	23 deg C
90% Maximum pH =	8 SU	1Q10 (Wet season) =	154 MGD	Wet Season - 1Q10 Mix =	20.37 %	90% Maximum pH =	7.9 SU
10% Maximum pH =	6.5 SU	30Q10 (Wet season) =	182 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	7 SU
Tier Designation (1 or 2) =	2	30Q5 =	156 MGD			Discharge Flow =	3.5 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	353 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	4.5E+04	--	--	na	9.9E+01	--	--	na	4.5E+03	--	--	na	4.5E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	4.2E+02	--	--	na	9.3E-01	--	--	na	4.2E+01	--	--	na	4.2E+01
Acrylonitrile ^c	0	--	--	na	2.5E+00	--	--	na	2.5E+02	--	--	na	2.5E-01	--	--	na	2.5E+01	--	--	na	2.5E+01
Aldrin ^c	0	3.0E+00	--	na	5.0E-04	2.4E+01	--	na	5.1E-02	7.5E-01	--	na	5.0E-05	2.6E+01	--	na	5.1E-03	2.4E+01	--	na	5.1E-03
Ammonia-N (mg/l) (Yearly)	0.1	8.63E+00	1.37E+00	na	--	6.77E+01	5.24E+01	na	--	2.19E+00	4.17E-01	na	--	7.32E+01	1.32E+01	na	--	6.77E+01	1.32E+01	na	--
Ammonia-N (mg/l) (High Flow)	0.1	8.59E+00	2.44E+00	na	--	8.46E+01	1.24E+02	na	--	2.19E+00	6.85E-01	na	--	9.40E+01	3.11E+01	na	--	8.46E+01	3.11E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	1.8E+06	--	--	na	4.0E+03	--	--	na	1.8E+05	--	--	na	1.8E+05
Antimony	0	--	--	na	6.4E+02	--	--	na	2.9E+04	--	--	na	6.4E+01	--	--	na	2.9E+03	--	--	na	2.9E+03
Arsenic	3.4E+02	1.5E+02	na	--	2.7E+03	5.7E+03	na	--	8.5E+01	3.8E+01	na	--	3.0E+03	1.4E+03	na	--	2.7E+03	1.4E+03	na	--	
Barium	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	na	--	--
Benzene ^c	0	--	--	na	5.1E+02	--	--	na	5.2E+04	--	--	na	5.1E+01	--	--	na	5.2E+03	--	--	na	5.2E+03
Benzidine ^c	0	--	--	na	2.0E-03	--	--	na	2.0E-01	--	--	na	2.0E-04	--	--	na	2.0E-02	--	--	na	2.0E-02
Benzo (a) anthracene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	--	--	na	1.8E+00
Benzo (b) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	--	--	na	1.8E+00
Benzo (k) fluoranthene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	--	--	na	1.8E+00
Benzo (a) pyrene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	--	--	na	1.8E+00
Bis2-Chloroethyl Ether ^c	0	--	--	na	5.3E+00	--	--	na	5.4E+02	--	--	na	5.3E-01	--	--	na	5.4E+01	--	--	na	5.4E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	3.0E+06	--	--	na	6.5E+03	--	--	na	3.0E+05	--	--	na	3.0E+05
Bis 2-Ethylhexyl Phthalate ^c	0	--	--	na	2.2E+01	--	--	na	2.2E+03	--	--	na	2.2E+00	--	--	na	2.2E+02	--	--	na	2.2E+02
Bromoform ^c	0	--	--	na	1.4E+03	--	--	na	1.4E+05	--	--	na	1.4E+02	--	--	na	1.4E+04	--	--	na	1.4E+04
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	8.7E+04	--	--	na	1.9E+02	--	--	na	8.7E+03	--	--	na	8.7E+03
Cadmium	0	5.6E+00	1.5E+00	na	--	4.5E+01	5.6E+01	na	--	1.4E+00	3.7E-01	na	--	5.0E+01	1.4E+01	na	--	4.5E+01	1.4E+01	na	--
Carbon Tetrachloride ^c	0	--	--	na	1.6E+01	--	--	na	1.6E+03	--	--	na	1.6E+00	--	--	na	1.6E+02	--	--	na	1.6E+02
Chlordane ^c	0	2.4E+00	4.3E-03	na	8.1E-03	1.9E+01	1.6E-01	na	8.3E-01	6.0E-01	1.1E-03	na	8.1E-04	2.1E+01	4.1E-02	na	8.3E-02	1.9E+01	4.1E-02	na	8.3E-02
Chloride	0	8.6E+05	2.3E+05	na	--	6.8E+06	8.7E+06	na	--	2.2E+05	5.8E+04	na	--	7.5E+06	2.2E+06	na	--	6.8E+06	2.2E+06	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.5E+02	4.2E+02	na	--	4.8E+00	2.8E+00	na	--	1.7E+02	1.0E+02	na	--	1.5E+02	1.0E+02	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	7.3E+04	--	--	na	1.6E+02	--	--	na	7.3E+03	--	--	na	7.3E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
Chlorodibromomethane ^c	0	--	--	na	1.3E+02	--	--	na	1.3E+04	--	--	na	1.3E+01	--	--	na	1.3E+03	--	--	na	1.3E+03	
Chloroform	0	--	--	na	1.1E+04	--	--	na	5.0E+05	--	--	na	1.1E+03	--	--	na	5.0E+04	--	--	na	5.0E+04	
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	7.3E+04	--	--	na	1.6E+02	--	--	na	7.3E+03	--	--	na	7.3E+03	
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	6.8E+03	--	--	na	1.5E+01	--	--	na	6.8E+02	--	--	na	6.8E+02	
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	6.6E-01	1.6E+00	na	--	2.1E-02	1.0E-02	na	--	7.3E-01	3.9E-01	na	--	6.6E-01	3.9E-01	na	--	
Chromium III	0	7.4E+02	9.7E+01	na	--	5.9E+03	3.7E+03	na	--	1.9E+02	2.4E+01	na	--	6.5E+03	9.2E+02	na	--	5.9E+03	9.2E+02	na	--	
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.3E+02	4.2E+02	na	--	4.0E+00	2.8E+00	na	--	1.4E+02	1.0E+02	na	--	1.3E+02	1.0E+02	na	--	
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	1.0E+01	--	--	--	4.6E+02	--	--	--	na	--	
Chrysene ^c	0	--	--	na	1.8E-02	--	--	na	1.8E+00	--	--	na	1.8E-03	--	--	na	1.8E-01	--	--	na	1.8E-01	
Copper	0	1.8E+01	1.2E+01	na	--	1.4E+02	4.5E+02	na	--	4.6E+00	3.0E+00	na	--	1.6E+02	1.1E+02	na	--	1.4E+02	1.1E+02	na	--	
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	1.7E+02	2.0E+02	na	7.3E+05	5.5E+00	1.3E+00	na	1.6E+03	1.9E+02	4.9E+01	na	7.3E+04	1.7E+02	4.9E+01	na	7.3E+04	
DDD ^c	0	--	--	na	3.1E-03	--	--	na	3.2E-01	--	--	na	3.1E-04	--	--	na	3.2E-02	--	--	na	3.2E-02	
DDE ^c	0	--	--	na	2.2E-03	--	--	na	2.2E-01	--	--	na	2.2E-04	--	--	na	2.2E-02	--	--	na	2.2E-02	
DDT ^c	0	1.1E+00	1.0E-03	na	2.2E-03	8.7E+00	3.8E-02	na	2.2E-01	2.8E-01	2.5E-04	na	2.2E-04	9.6E+00	9.5E-03	na	2.2E-02	8.7E+00	9.5E-03	na	2.2E-02	
Demeton	0	--	--	1.0E-01	na	--	--	3.8E+00	na	--	--	2.5E-02	na	--	--	9.5E-01	na	--	--	9.5E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.3E+00	6.4E+00	na	--	4.3E-02	4.3E-02	na	--	1.5E+00	1.6E+00	na	--	1.3E+00	1.6E+00	na	--	
Dibenz(a,h)anthracene ^c	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	--	--	na	1.8E+00	
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	5.9E+04	--	--	na	1.3E+02	--	--	na	5.9E+03	--	--	na	5.9E+03	
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	4.4E+04	--	--	na	9.6E+01	--	--	na	4.4E+03	--	--	na	4.4E+03	
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	8.7E+03	--	--	na	1.9E+01	--	--	na	8.7E+02	--	--	na	8.7E+02	
3,3-Dichlorobenzidine ^c	0	--	--	na	2.8E-01	--	--	na	2.9E+01	--	--	na	2.8E-02	--	--	na	2.9E+00	--	--	na	2.9E+00	
Dichlorobromomethane ^c	0	--	--	na	1.7E+02	--	--	na	1.7E+04	--	--	na	1.7E+01	--	--	na	1.7E+03	--	--	na	1.7E+03	
1,2-Dichloroethane ^c	0	--	--	na	3.7E+02	--	--	na	3.8E+04	--	--	na	3.7E+01	--	--	na	3.8E+03	--	--	na	3.8E+03	
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	3.2E+05	--	--	na	7.1E+02	--	--	na	3.2E+04	--	--	na	3.2E+04	
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	4.6E+05	--	--	na	1.0E+03	--	--	na	4.6E+04	--	--	na	4.6E+04	
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	1.3E+04	--	--	na	2.9E+01	--	--	na	1.3E+03	--	--	na	1.3E+03	
2,4-Dichlorophenoxyacetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	
1,2-Dichloropropane ^c	0	--	--	na	1.5E+02	--	--	na	1.5E+04	--	--	na	1.5E+01	--	--	na	1.5E+03	--	--	na	1.5E+03	
1,3-Dichloropropene ^c	0	--	--	na	2.1E+02	--	--	na	2.1E+04	--	--	na	2.1E+01	--	--	na	2.1E+03	--	--	na	2.1E+03	
Dieldrin ^c	0	2.4E-01	5.6E-02	na	5.4E-04	1.9E+00	2.1E+00	na	5.5E-02	6.0E-02	1.4E-02	na	5.4E-05	2.1E+00	5.3E-01	na	5.5E-03	1.9E+00	5.3E-01	na	5.5E-03	
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	2.0E+06	--	--	na	4.4E+03	--	--	na	2.0E+05	--	--	na	2.0E+05	
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	3.9E+04	--	--	na	8.5E+01	--	--	na	3.9E+03	--	--	na	3.9E+03	
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	5.0E+07	--	--	na	1.1E+05	--	--	na	5.0E+06	--	--	na	5.0E+06	
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	2.1E+05	--	--	na	4.5E+02	--	--	na	2.1E+04	--	--	na	2.1E+04	
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	2.4E+05	--	--	na	5.3E+02	--	--	na	2.4E+04	--	--	na	2.4E+04	
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	1.3E+04	--	--	na	2.8E+01	--	--	na	1.3E+03	--	--	na	1.3E+03	
2,4-Dinitrotoluene ^c	0	--	--	na	3.4E+01	--	--	na	3.5E+03	--	--	na	3.4E+00	--	--	na	3.5E+02	--	--	na	3.5E+02	
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	2.3E-06	--	--	na	5.1E-09	--	--	na	2.3E-07	--	--	na	2.3E-07	
1,2-Diphenylhydrazine ^c	0	--	--	na	2.0E+00	--	--	na	2.0E+02	--	--	na	2.0E-01	--	--	na	2.0E+01	--	--	na	2.0E+01	
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.7E+00	2.1E+00	na	4.1E+03	5.5E-02	1.4E-02	na	8.9E+00	1.9E+00	5.3E-01	na	4.1E+02	1.7E+00	5.3E-01	na	4.1E+02	
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.7E+00	2.1E+00	na	4.1E+03	5.5E-02	1.4E-02	na	8.9E+00	1.9E+00	5.3E-01	na	4.1E+02	1.7E+00	5.3E-01	na	4.1E+02	
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.7E+00	2.1E+00	--	--	5.5E-02	1.4E-02	--	--	1.9E+00	5.3E-01	--	--	1.7E+00	5.3E-01	--	--	
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	4.1E+03	--	--	na	8.9E+00	--	--	na	4.1E+02	--	--	na	4.1E+02	
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	6.8E-01	1.4E+00	na	2.7E+00	2.2E-02	9.0E-03	na	6.0E-03	7.5E-01	3.4E-01	na	2.7E-01	6.8E-01	3.4E-01	na	2.7E-01	
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	1.4E+01	--	--	na	3.0E-02	--	--	na	1.4E+00	--	--	na	1.4E+00	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	9.6E+04	--	--	na	2.1E+02	--	--	na	9.6E+03	--	--	na	9.6E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	6.4E+03	--	--	na	1.4E+01	--	--	na	6.4E+02	--	--	na	6.4E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	2.4E+05	--	--	na	5.3E+02	--	--	na	2.4E+04	--	--	na	2.4E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	3.8E-01	na	--	--	2.5E-03	na	--	--	9.5E-02	na	--	--	9.5E-02	na	--
Heptachlor C	0	5.2E-01	3.8E-03	na	7.9E-04	4.1E+00	1.4E-01	na	8.0E-02	1.3E-01	9.5E-04	na	7.9E-05	4.6E+00	3.6E-02	na	8.0E-03	4.1E+00	3.6E-02	na	8.0E-03
Heptachlor Epoxide C	0	5.2E-01	3.8E-03	na	3.9E-04	4.1E+00	1.4E-01	na	4.0E-02	1.3E-01	9.5E-04	na	3.9E-05	4.6E+00	3.6E-02	na	4.0E-03	4.1E+00	3.6E-02	na	4.0E-03
Hexachlorobenzene C	0	--	--	na	2.9E-03	--	--	na	3.0E-01	--	--	na	2.9E-04	--	--	na	3.0E-02	--	--	na	3.0E-02
Hexachlorobutadiene C	0	--	--	na	1.8E+02	--	--	na	1.8E+04	--	--	na	1.8E+01	--	--	na	1.8E+03	--	--	na	1.8E+03
Hexachlorocyclohexane																					
Alpha-BHC C	0	--	--	na	4.9E-02	--	--	na	5.0E+00	--	--	na	4.9E-03	--	--	na	5.0E-01	--	--	na	5.0E-01
Hexachlorocyclohexane																					
Beta-BHC C	0	--	--	na	1.7E-01	--	--	na	1.7E+01	--	--	na	1.7E-02	--	--	na	1.7E+00	--	--	na	1.7E+00
Hexachlorocyclohexane																					
Gamma-BHC C (Lindane)	0	9.5E-01	na	na	1.8E+00	7.5E+00	--	na	1.8E+02	2.4E-01	--	na	1.8E-01	8.3E+00	--	na	1.8E+01	7.5E+00	--	na	1.8E+01
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	5.0E+04	--	--	na	1.1E+02	--	--	na	5.0E+03	--	--	na	5.0E+03
Hexachloroethane C	0	--	--	na	3.3E+01	--	--	na	3.4E+03	--	--	na	3.3E+00	--	--	na	3.4E+02	--	--	na	3.4E+02
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	7.6E+01	na	--	--	5.0E-01	na	--	--	1.9E+01	na	--	--	1.9E+01	na	--
Indeno (1,2,3-cd) pyrene C	0	--	--	na	1.8E-01	--	--	na	1.8E+01	--	--	na	1.8E-02	--	--	na	1.8E+00	--	--	na	1.8E+00
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Isophorone C	0	--	--	na	9.6E+03	--	--	na	9.8E+05	--	--	na	9.6E+02	--	--	na	9.8E+04	--	--	na	9.8E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Lead	0	1.8E+02	2.1E+01	na	--	1.4E+03	7.8E+02	na	--	4.5E+01	5.1E+00	na	--	1.6E+03	1.9E+02	na	--	1.4E+03	1.9E+02	na	--
Malathion	0	--	1.0E-01	na	--	--	3.8E+00	na	--	--	2.5E-02	na	--	--	9.5E-01	na	--	--	9.5E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.1E+01	2.9E+01	--	--	3.5E-01	1.9E-01	--	--	1.2E+01	7.3E+00	--	--	1.1E+01	7.3E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	6.8E+04	--	--	na	1.5E+02	--	--	na	6.8E+03	--	--	na	6.8E+03
Methylene Chloride C	0	--	--	na	5.9E+03	--	--	na	6.0E+05	--	--	na	5.9E+02	--	--	na	6.0E+04	--	--	na	6.0E+04
Methoxychlor	0	--	3.0E-02	na	--	--	1.1E+00	na	--	--	7.5E-03	na	--	--	2.8E-01	na	--	--	2.8E-01	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Nickel	0	2.4E+02	2.7E+01	na	4.6E+03	1.9E+03	1.0E+03	na	2.1E+05	6.0E+01	6.7E+00	na	4.6E+02	2.1E+03	2.5E+02	na	2.1E+04	1.9E+03	2.5E+02	na	2.1E+04
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	3.1E+04	--	--	na	6.9E+01	--	--	na	3.1E+03	--	--	na	3.1E+03
N-Nitrosodimethylamine C	0	--	--	na	3.0E+01	--	--	na	3.1E+03	--	--	na	3.0E+00	--	--	na	3.1E+02	--	--	na	3.1E+02
N-Nitrosodiphenylamine C	0	--	--	na	6.0E+01	--	--	na	6.1E+03	--	--	na	6.0E+00	--	--	na	6.1E+02	--	--	na	6.1E+02
N-Nitrosodi-n-propylamine C	0	--	--	na	5.1E+00	--	--	na	5.2E+02	--	--	na	5.1E-01	--	--	na	5.2E+01	--	--	na	5.2E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.2E+02	2.5E+02	na	--	7.0E+00	1.7E+00	--	--	2.5E+02	6.2E+01	--	--	2.2E+02	6.2E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	5.2E-01	4.9E-01	na	--	1.6E-02	3.3E-03	na	--	5.7E-01	1.2E-01	na	--	5.2E-01	1.2E-01	na	--
PCB Total C	0	--	1.4E-02	na	6.4E-04	--	5.3E-01	na	6.5E-02	--	3.5E-03	na	6.4E-05	--	1.3E-01	na	6.5E-03	--	1.3E-01	na	6.5E-03
Pentachlorophenol C	0	5.5E+00	4.1E+00	na	3.0E+01	4.4E+01	1.5E+02	na	3.1E+03	1.3E+00	1.0E+00	na	3.0E+00	4.7E+01	3.9E+01	na	3.1E+02	4.4E+01	3.9E+01	na	3.1E+02
Phenol	0	--	--	na	8.6E+05	--	--	na	3.9E+07	--	--	na	8.6E+04	--	--	na	3.9E+06	--	--	na	3.9E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	1.8E+05	--	--	na	4.0E+02	--	--	na	1.8E+04	--	--	na	1.8E+04
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	1.6E+02	1.9E+02	na	1.9E+05	5.0E+00	1.3E+00	na	4.2E+02	1.8E+02	4.7E+01	na	1.9E+04	1.6E+02	4.7E+01	na	1.9E+04
Silver	0	6.0E+00	--	na	--	4.8E+01	--	na	--	1.5E+00	--	na	--	5.3E+01	--	na	--	4.8E+01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	4.1E+03	--	--	na	4.0E+00	--	--	na	4.1E+02	--	--	na	4.1E+02
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	3.4E+03	--	--	na	3.3E+00	--	--	na	3.4E+02	--	--	na	3.4E+02
Thallium	0	--	--	na	4.7E-01	--	--	na	2.1E+01	--	--	na	4.7E-02	--	--	na	2.1E+00	--	--	na	2.1E+00
Toluene	0	--	--	na	6.0E+03	--	--	na	2.7E+05	--	--	na	6.0E+02	--	--	na	2.7E+04	--	--	na	2.7E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	5.8E+00	7.6E-03	na	2.9E-01	1.8E-01	5.0E-05	na	2.8E-04	6.4E+00	1.9E-03	na	2.9E-02	5.8E+00	1.9E-03	na	2.9E-02
Tributyltin	0	4.6E-01	7.2E-02	na	--	3.6E+00	2.7E+00	na	--	1.2E-01	1.8E-02	na	--	4.0E+00	6.8E-01	na	--	3.6E+00	6.8E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	3.2E+03	--	--	na	7.0E+00	--	--	na	3.2E+02	--	--	na	3.2E+02
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	1.6E+04	--	--	na	1.6E+01	--	--	na	1.6E+03	--	--	na	1.6E+03
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	3.1E+04	--	--	na	3.0E+01	--	--	na	3.1E+03	--	--	na	3.1E+03
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	2.4E+03	--	--	na	2.4E+00	--	--	na	2.4E+02	--	--	na	2.4E+02
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	2.4E+03	--	--	na	2.4E+00	--	--	na	2.4E+02	--	--	na	2.4E+02
Zinc	0	1.5E+02	1.6E+02	na	2.6E+04	1.2E+03	5.9E+03	na	1.2E+06	3.9E+01	3.9E+01	na	2.6E+03	1.4E+03	1.5E+03	na	1.2E+05	1.2E+03	1.5E+03	na	1.2E+05

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	2.9E+03
Arsenic	8.5E+02
Barium	na
Cadmium	8.3E+00
Chromium III	5.5E+02
Chromium VI	5.1E+01
Copper	5.8E+01
Iron	na
Lead	1.2E+02
Manganese	na
Mercury	4.4E+00
Nickel	1.5E+02
Selenium	2.8E+01
Silver	1.9E+01
Zinc	4.9E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

3.500 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD) 3.500				Ammonia - Dry Season - Acute	Ammonia - Dry Season - Chronic																																				
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3.500 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

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7/5/2016 3:20:22 PM

Facility = Lower Jackson River Regional
Chemical = Ammonia for 3.5 MGD
Chronic averaging period = 30
WLAA = 53.2
WLAC = 11.1
Q.L. = 0.2
samples/mo. = 4
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 9
Variance = 29.16
C.V. = 0.6
97th percentile daily values = 21.9007
97th percentile 4 day average = 14.9741
97th percentile 30 day average= 10.8544
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

	A	B	C	D	E	F	G	H	I	J	K	L	M														
1	Spreadsheet for determination of WET test endpoints or WET limits																										
2																											
3																											
4	Excel 97																										
5	Revision Date: 01/10/05																										
6	File: WETLIM10.xls																										
7	(MIX.EXE required also)																										
8																											
9																											
10																											
11																											
12																											
13																											
14																											
15	Enter data in the cells with blue type:																										
16																											
17	Entry Date:	06/14/11																									
18	Facility Name:	Lower Jackson River																									
19	VPDES Number:	VA0090671																									
20	Outfall Number:	001																									
21																											
22	Plant Flow:	2.6 MGD																									
23	Acute 1Q10:	119 MGD			20.4 %																						
24	Chronic 7Q10:	129 MGD			100 %																						
25																											
26	Are data available to calculate CV? (Y/N)	N			(Minimum of 10 data points, same species, needed)																						
27	Are data available to calculate ACR? (Y/N)	N			(NOEC<LC50, do not use greater/less than data)																						
28																											
29	IWC _a	9.67405864 %			Plant flow/plant flow + 1Q10																						
30	IWC _c	1.975683891 %			Plant flow/plant flow + 7Q10																						
31	Dilution, acute	10.33692308			100/IWC _a																						
32	Dilution, chronic	50.61538462			100/IWC _c																						
33	WLA _a	3.101076923 Instream criterion (0.3 TU _a) X's Dilution, acute																									
34	WLA _c	50.61538462 Instream criterion (1.0 TU _c) X's Dilution, chronic																									
35	WLA _{a,c}	31.01076923 ACR X's WLA _a - converts acute WLA to chronic units																									
36	ACR -acute/chronic ratio	10 LC50/NOEC (Default is 10 - if data are available, use tables Page 3)																									
37	CV-Coefficient of variatior	0.6 Default of 0.6 - if data are available, use tables Page 2)																									
38	Constants eA	0.4109447 Default = 0.41																									
39	eB	0.6010373 Default = 0.60																									
40	eC	2.4334175 Default = 2.43																									
41	eD	2.4334175 Default = 2.43 (1 samp) No. of sample: 1 **The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA _{a,c} and MDL using it are driven by the ACR.																									
42	LTA _{a,c}	12.74371126 WLA _{a,c} X's eA																									
43	LTA _c	30.42173411 WLAc X's eB																									
44	MDL** with LTA _{a,c}	31.01076999 TU _c			NOEC = 3.224686 (Protects from acute/chronic toxicity)																						
45	MDL** with LTA _c	74.02878016 TU _c			NOEC = 1.350826 (Protects from chronic toxicity)																						
46	AML with lowest LTA	31.01076999 TU _c			NOEC = 3.224686 Lowest LTA X's eD																						
47	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU _c to TU _a																										
48																											
49																											
50																											
51																											
52																											
53																											
54																											
55	MDL with LTA _{a,c}	3.101076999 TU _a			LC50 = 32.246861 %																						
56	MDL with LTA _c	7.402878016 TU _a			LC50 = 13.508260 %																						
57																											
58																											

NOTE: If the IWC_a is >33%, specify the NOAEC = 100% test/endpoint for use

	A	B	C	D	E	F	G	H	I	J	K	L	M	
110	Page 3 - Follow directions to develop a site specific ACR (Acute to Chronic Ratio)													
111	To determine Acute/Chronic Ratio (ACR), insert usable data below. Usable data is defined as valid paired test results, acute and chronic, tested at the same temperature, same species. The chronic NOEC must be less than the acute LC ₅₀ , since the ACR divides the LC ₅₀ by the NOEC. LC ₅₀ 's >100% should not be used.													
112														
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Table 1. ACR using Vertebrate data

ACR for vertebrate data: 0

Table 2. ACR using Invertebrate data

DILUTION SERIES TO RECOMMEND

Table 4.

	Monitoring % Effluent	Limit % Effluent
Dilution series based on data mean	7.8	12.743711
Dilution series to use for limit		4
Dilution factor to recommend:	0.2801251	0.2
Dilution series to recommend:	100.0	100.0
	28.0	20.0
	7.8	4.0
	2.2	0.8
	0.62	0.2
Extra dilutions if needed	0.17	3125.00
	0.05	15625.00

Convert LC₅₀'s and NOEC's to C for use in WLA.EXE

Table 3. **ACR used: 10**

	Enter LC ₅₀	TUc	Enter NOEC
1	NO DATA		
2	NO DATA		
3	NO DATA		
4	NO DATA		
5	NO DATA		
6	NO DATA		
7	NO DATA		
8	NO DATA		
9	NO DATA		
10	NO DATA		
11	NO DATA		
12	NO DATA		
13	NO DATA		
14	NO DATA		
15	NO DATA		
16	NO DATA		
17	NO DATA		
18	NO DATA		
19	NO DATA		
20	NO DATA		

If WLA.EXE determines that an acute limit is needed convert the TUc answer you get to TUa and then an

enter it here: **NO DATA %LC₅₀**

NO DATA TUa

APPENDIX D

TMDL Assessment Information



2012 Impaired Waters

Category 4 & 5 by 2012 Impaired Area ID*

James River Basin

Cause Group Code: **I09R-01-BEN - Jackson River**

Location:	Jackson River mainstem from the Westvaco main processing outfall downstream to the confluence of the Jackson and Cowpasture Rivers.
City/County	Alleghany Co., Covington City
Use(s):	Aquatic Life
Cause(s) / VA Category:	Benthic-Macroinvertebrate Bioassessments / 4A

The Jackson River General Standard - Benthic TMDL received U.S. EPA approval on 7/21/2010. The SWCB approved the Benthic TMDL on 12/9/2010. Federal IDs follow below by 2012 Assessment Units. The original 1996 VAW-I04R and VAW-I09R impairments were combined into one in 2002.

The 1996/1998 originally 303(d) Listed impairments to the benthic community are believed due to nutrient and organic enrichment (deposition) for 24.18 miles. Based on previous ambient station solids data, the nutrients and organics are mainly dissolved. Maxima have been greatly reduced since 1996.

The waters are partially de-listed (shortened- Category 2C) for 9.81 miles from the mouth of Karnes Creek downstream to the confluence of the Cowpasture and Jackson Rivers. The de-listing is based on Virginia Stream Condition Index (VSCI) scores of the 1996-1998 Listed reach currently achieving VSCI scores above 60 from station 2-JKS006.67. VSCI scores at 2-JKS006.67 have steadily increased since 2001. Improvements at discharging facilities have had a positive effect on the benthic community. Both the 2006 and 2012 flow adjusted trend analysis show a significant declining trend for total phosphorus and total nitrogen in both upstream station 2-JKS023.61 and downstream station 2-JKS000.38. 2007 - 2010 VSCI scores from four surveys have an average of 64.10. Benthic trend analysis also shows improving conditions at 2-JKS006.67 (+10 points) over the time period of 1994 - 2010. The VSCI is a multi-metric statewide stream index of biotic integrity that is based on data collected from minimally impacted reference sites throughout Virginia. This index shows that an SCI score of 60.0 is the lower limit for reference (or, unimpacted) conditions in a benthic community.

Federal IDs by Assessment Unit:

VAW-I04R_JKS01A00 - Total Phosphorus - 38981. Total Nitrogen - 39001.
 VAW-I09R_JKS01A00 - Total Phosphorus - 39017. Total Nitrogen - 39022. De-list 2012- 3.48 miles.
 VAW-I09R_JKS02A00 - Total Phosphorus - 38996. Total Nitrogen - 39003. De-list 2012- 1.71 miles.
 VAW-I09R_JKS03A00 - Total Phosphorus - 38997. Total Nitrogen - 39004. De-list 2012- 4.62 miles.
 VAW-I09R_JKS03B10 - Total Phosphorus - 38997. Total Nitrogen - 39004.
 VAW-I09R_JKS04A00 - Total Phosphorus - 38995. Total Nitrogen - 39002.
 VAW-I09R_JKS05A00 - Total Phosphorus - 38998. Total Nitrogen - 39005.
 VAW-I09R_JKS06A00 - Total Phosphorus - 38999. Total Nitrogen - 39006.

2012 Benthic Assessment station locations are:

2-JKS000.38 - Rt. 727 Bridge - near Iron Gate (I09R)
 2-JKS006.67 - Low Water Bridge - near Dabney Lancaster CC (I09R)
 2-JKS013.29 - Off Rt. 696 above Lowmoor (I09R)
 2-JKS018.68 - Rt. 18 Bridge at Covington (I09R)
 2-JKS020.41 - Upper Horse Shoe at Rayon Terrace (I09R)
 2-JKS022.78 - Fudge's Bridge, Rt. 154, Covington (I09R)
 2-JKS023.61 - City Park - Covington at gage (I09R)

General Standard (Benthic):

2-JKS023.61-Bio 'IM' The 2012 data window reports an average Virginia Stream Condition Index (VSCI) score of 35.95 from five surveys (2006-2008 & 2010). The lowest score occurs in spring 2007 at 32.92 and the highest 38.47 fall 2008. Seven VSCI surveys (2003 - 2008) for 2010 have an average score of 45.15 with the lowest score in spring 2007 32.92 and highest score 57.38 spring 2004. The 2008 Integrated Report (IR) assessed seven VSCI surveys (2001 - 2006) with an average score of 34.36; lowest score spring 2001 at 31.03 and highest score 52.38 spring 2004. The invertebrate community at this site has been dominated by taxa that are tolerant of environments with low dissolved oxygen and high levels of organic pollution (i.e.

Tubificidae, Tricladida, Chironomidae, Lumbriculidae and Simuliidae). The VSCI scores display a negative alteration in the taxonomic diversity and pollution sensitivity of the benthic community. Recent improvement in the historical trend of the benthic community may be due to a reduction in cooling water discharges and efforts in the watershed to reduce nutrient discharge to the river. However, a recently discovered and repaired sewer line contributed pollution to the river and may be responsible for the VSCI decline since 2007.

Both 2006 and 2012 flow adjusted trend analysis find significant declining trends for total phosphorus and total nitrogen at 2-JKS023.61. The 2012 data window finds five of 41 total phosphorus samples are elevated above 0.20 mg/l ranging from 0.24 to 0.52 mg/l; although maxima are reduced. An 'Observed effect' is noted for these waters. Past values above 0.20 have been greater than 1.40 mg/l. The 2010 assessment finds elevated total phosphorus levels in six of 40 samples are above 0.20 mg/l. The maximum value is 0.40 mg/l and the lowest 0.28 mg/l. 2008 elevated total phosphorus levels were 17 of 51 samples- 'Observed Effect'. The maximum value is 1.40 mg/l and the lowest 0.23 mg/l.

2-JKS022.78- There are no additional data beyond the 2010 Integrated Report (IR) where elevated TP values greater than 0.20 mg/l are found in two of 12 samples with excessive values at 0.28 and 0.39 mg/l.

2-JKS020.41- A 2007 probability station. Bio 'IM' Two VSCI surveys (2007), average score 48.13. The invertebrate community at this site is dominated by taxa that are tolerant of environments with low dissolved oxygen and high levels of organic pollution (i.e. Tricladida and Asellidae).

2-JKS018.68- Bio 'IM' The 2012 assessment finds from five surveys (2006-2008 & 2010) an average score of 50.37. Five VSCI surveys within the 2010 data window (2004, 2006-2008) have an average score of 54.28. The 2008 assessment reports two VSCI scores from the fall of 2004 (67.3) and 2006 (51.8). The benthic community shows some improvement at this station relative to the station at City Park (2-JKS023.61). However, the benthic community remains dominated by pollution tolerant taxa.

Two total phosphorus observations are elevated within the 2012 data window from 22 samples. Samples greater than 0.20 mg/l are 0.22 and 0.30 mg/l. The 2010 assessment finds two of 16 total phosphorus observations are elevated with excessive values the same as 2012. 2008 assessment TP results find no elevated TP levels above 0.20 mg/l from nine observations (no additional data). The 2006 IR reported six of 18 observations greater than 0.20 mg/l. Elevated TP values ranged from 0.30 to 0.70 mg/l- 'Observed Effect'.

2-JKS013.29- The average VSCI score within the 2012 data window (2006-2008 & 2010) is 54.04. The lowest score is 36.68 (spring 2007) and the highest 61.26 (fall 2006). 2010 results also find an impaired condition with the lowest at 38.6; fall 2004 and the highest 61.26; fall 2006 from six VSCI survey scores (2003, 2004, 2006 & 2007). Lower VSCI scores are the result of the low taxonomic diversity and lack of pollution sensitive taxa. The 2008 IR found impairment from four VSCI surveys (2003 - 2004 & 2006). The Low Moor station through the 2008 assessment has consistently had lower assessment scores and higher numbers of pollution tolerant organisms than at 2-JKS018.68. The 2006 sample showed an increase in pollution sensitive taxa and a decrease in pollution tolerant taxa.

One TP observation from a total of six is greater than 0.20 mg/l at 0.43 mg/L in 2012. There are no additional total phosphorous data within the 2010 data window. 2008 elevated TP samples are found in six of 12 samples with excessive values ranging from 0.29 to 1.41 mg/l- 'Observed Effect'.

2-JKS006.67- Bio 'FS' The 2012 assessment finds 'full support' from four VSCI surveys (2007-2008 & 2010) with an average score of 64.1. 2010 results also find 'full support' from six VSCI surveys (2003-2008) with an average score of 61.2. Benthic trend analysis also shows improving conditions (+10 points) over the time period of 1994 - 2010. VSCI scores have increased by 14 points from 2000-2005; and with an additional increase of 11 points from 2006-2010. There have been slight differences in scores over the current six-year period. Spring scores have been lower than fall scores. Lower VSCI scores are the result of the decrease in pollution sensitive taxa. Recent improvements in the benthic community may be due to a reduction in cooling water discharges and efforts to reduce nutrient discharge to the river. A recently discovered and repaired sewer line may be responsible for the VSCI decline since 2007. The waters in this portion of the original 303(d) Listing (9.81 miles) are delisted with the 2012 assessment based on VSCI scores from both the 2010 and 2012 assessments, Benthic trend analysis and 2006 / 2012 flow adjusted trend analysis at upstream station 2-JKS023.61 and downstream station 2-JKS000.38.

2-JKS000.38- 2006 and 2012 flow adjusted trend analysis reveals significant declining trends in total phosphorus and total nitrogen at this station. The 2012 Integrated Report (IR) finds no elevated TP observations (greater than 0.20 mg/L) from 36 samples. The 2010 assessment finds a single elevated TP observation from 38 observations at 0.22 mg/l. The 2008 assessment reported elevated TP observations in 15 of 50 observations- 'Observed Effect'. Values above 0.20 mg/l range from 0.22 to 1.24 mg/l.

Assessment Unit	Water name	Location Description	Cause Category	Cause Name	Cycle First Listed	TMDL Schedule	Size
VAW-I04R_JKS01A00	Jackson River	Jackson River mainstem from the Westvaco main processing outfall downstream to Dunlap Creek mouth at the watershed boundary with I09R.	4A	Benthic-Macroinvertebrate Bioassessments	1996	2010	0.46

VAW-I09R_JKS03B10	Jackson River	Jackson River mainstem from upstream of the Lowmoor community downstream to near the mouth of Karnes Creek.	4A	Benthic-Macroinvertebrate Bioassessments	1996	2010	3.18
VAW-I09R_JKS04A00	Jackson River	Jackson River mainstem from the Covington STP outfall downstream to just above the Lowmoor community.	4A	Benthic-Macroinvertebrate Bioassessments	1996	2010	5.81
VAW-I09R_JKS05A00	Jackson River	Jackson River mainstem from downstream of the Lexington Avenue Bridge to the City of Covington STP outfall on the Jackson River.	4A	Benthic-Macroinvertebrate Bioassessments	1996	2010	3.26
VAW-I09R_JKS06A00	Jackson River	Jackson River mainstem from the watershed boundary (I04R) at the mouth of Dunlap Creek downstream to just below the Lexington Avenue Bridge.	4A	Benthic-Macroinvertebrate Bioassessments	1996	2010	1.66

Jackson River	Estuary (sq. miles)	Reservoir (acres)	River (miles)
Impaired area ID: VAW-I04R-01	Benthic-Macroinvertebrate Bioassessments / 4A		
	Total impaired size by water type:		14.37

Aquatic Life**Sources:**

- Industrial Point Source Discharge
- Municipal (Urbanized High Density Area)
- Municipal Point Source Discharges

* Narrative descriptions, location and city/county describe the entire extent of the impairment. Sizes may not represent the total size of the impairment.